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MINISTRY OF HEALTH

REPORT ON MATERNAL MORTALITY IN WALES

*Presented by the Minister of Health to Parliament
by Command of His Majesty
April, 1937*

The Royal Sanitary Institute
Library.

LONDON

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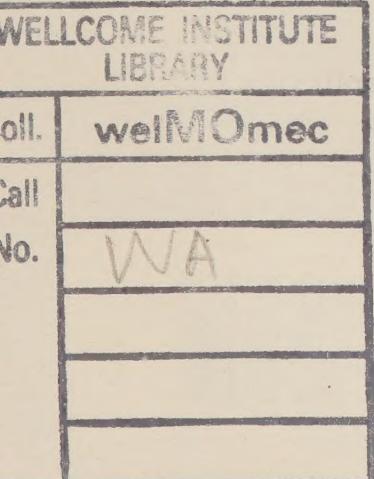
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Prefatory Note by the Chief Medical Officer.

TO THE RIGHT HON. SIR KINGSLEY WOOD, M.P.,
Minister of Health.

SIR,

I have the honour to present a report on maternal mortality in Wales which, in accordance with the directions of your predecessor, Lord Kennet of the Dene, has been made by Medical Officers of the Welsh Board of Health.

When in 1934 the Minister of Health announced his intention of arranging for special visits to be made by suitable Medical Officers to areas having a persistently high maternal mortality rate it was necessary to give special consideration to the investigation in Wales. In England there are large areas where the puerperal death-rate is relatively low, and generally the areas of high rates are industrial in character. In Wales, however, the rates are uniformly high in most parts of the country, in industrial and rural areas alike.

Moreover, the geographical area and importance of the Principality called for special attention to its own problems of maternal mortality.

For these reasons, and having regard to the differing social, economic, environmental and administrative conditions of the two countries it was considered expedient that the two investigations should be planned on somewhat different lines, that they should be made independently, and that their results should be presented as separate reports. At the same time close touch has been maintained throughout the course of the two investigations. The Medical Officers of the Welsh Board of Health have been kept informed of the results obtained by their English colleagues; the Welsh observers on their side have reciprocated; from time to time, conferences have been held at Whitehall in order to compare results and to mark progress.

In selecting the county and county borough areas to be visited in England for the purpose of the special investigations it was considered convenient to regard a continuous puerperal mortality rate of 5 or more per 1,000 live births as denoting a position sufficiently serious to call for detailed inquiry into the general circumstances of that area. In Wales there were only two counties and two county boroughs which showed for the ten-year period 1924-33 a rate below this standard, and in each of these areas the rate exceeded 4 per 1,000 live births, while four counties recorded the exceptionally high puerperal

mortality rate of 6 or more per 1,000 live births. Accordingly it was decided that the investigation in Wales should include the whole of the country and that, for this purpose, visits should be made to all the county and county borough areas.

Dr. T. W. Wade, Medical Member of the Welsh Board of Health, supervised the general conduct of the inquiry.

The Medical Officers appointed to carry out the investigations were Dr. Nancy G. Howell, D.P.H., and Dr. A. Trevor Jones, M.R.C.P., D.P.H., and with them on the statistical side was associated Mr. Harry Old, a Higher Executive Officer of the Welsh Board of Health. Dr. Jones concentrated mainly on the clinical and statistical aspects of the inquiry, while Dr. Howell, as the Officer specially concerned with the medical work arising from the provision of maternity and child welfare services in Wales, devoted her attention particularly to a detailed examination of the standard of Local Authority service in relation to the problem of maternal mortality.

The report indicates that there are many factors contributing to the high maternal mortality rate in Wales, and that too many women enter into childbearing and childbirth under handicap. These handicaps can in large measure be overcome by improved attendance and attention to the mothers during all stages of childbearing, particularly if the willing and intelligent co-operation of the mother is obtained.

It will be observed that the recommendations made by the investigators are applicable to the special conditions of Wales, but that nevertheless, they correspond generally to those of the English investigation.

I have the honour to be,

Sir,

Your obedient Servant,

ARTHUR S. MACNALTY.

Whitehall, S.W.1.

March, 1937.

I.

DESCRIPTIVE AND GENERAL.

Nature and Scope of Inquiry.

Method of Investigation.

The investigation into maternal mortality in Wales described in this report covered the whole of Wales. An attempt has been made to examine all the influences which might have an effect upon the risk of the mother in pregnancy and childbirth, and from such examination to consider whether there are any special factors which might account for the high puerperal mortality general in Wales.

Personal visits were made to all the county and county borough areas, and a detailed survey was made of the maternity and child welfare services provided or subsidised by the Local Authorities. In the course of the survey the various hospitals, institutions, homes and clinics which make provision for midwifery and allied services were visited, and interviews held with officials and other persons concerned with maternity work. Opinions were obtained as far as possible from medical practitioners and consultants who have had experience of midwifery practice.

Much information has been obtained from the records of the public health authorities and from voluntary organisations engaged in maternity work, as well as from the Medical Officers of the various Authorities, the supervisors of midwives, health visitors, sanitary inspectors, district nursing associations, consultants and medical practitioners, and others who have so readily given assistance. The records of the cases attended by midwives in 1934 have been readily available and have proved of great value. The methods of keeping records varied in different districts, and some difficulty has been found in presenting the material in a convenient form for comparative purposes.

Authorities administering Maternity Services.

The Local Authority for the exercise of powers contained in the Maternity and Child Welfare Act is the same as the Authority for the Notification of Births Act, and in some counties functions are divided between county councils and district councils according to the readiness with which the Authorities adopted the Notification of Births Act. At the present time maternity and child welfare functions are administered by the four county borough councils, by ten county councils in respect

of the whole of the administrative county and by two councils in respect of portions of the county. In the county of Glamorgan the maternity and child welfare functions are practically entirely administered by the 24 district councils. Maternity and child welfare functions are discharged in respect of their own areas by seven non-county borough councils, 14 urban district councils and seven rural district councils, and of these Authorities two borough councils, nine urban district councils and the seven rural district councils are not the Authorities in the area for the purposes of elementary education. A list of the Maternity and Child Welfare Authorities is given in Appendix I.

The Local Supervising Authorities under the Midwives Acts are the county councils and county borough councils, but in the county of Glamorgan certain powers have been delegated to two urban district councils under Section 9 of the Midwives Act, 1902.

Geographical and Industrial Features.

In considering the health problems of Wales, and particularly the special problems presented in the provision of services for securing a higher standard of maternal care and so reducing the risks attendant on childbearing, there should be some appreciation of the physical and industrial characteristics of the country, as these must influence the people and their mode of living.

Wales is a rugged, hilly country, with a margin of fairly flat and fertile land around its coast. Mountain ranges run from north to south, and act as a barrier to easy communication between east and west.

The population of Wales is about $2\frac{1}{2}$ million, and roughly three-quarters of the population live in the industrial parts of South Wales situated on or near the coalfield area. There are also important industrial districts in the coalfield areas of Denbighshire and Flintshire, and slate quarrying is carried on in parts of Caernarvonshire and Merionethshire. The rest of Wales is mainly rural and is for the most part mountainous.

The rainfall of Wales is heavy. The districts of lowest rainfall are Anglesey and the eastern areas bordering on England, more particularly in the north-east. Around the coast the rainfall averages 30 to 40 inches or more per annum, while inland, readings up to 80 inches are recorded, with even higher amounts in the most elevated parts of the mountain ranges.

The water supply in most districts is soft, the districts of hard water being limited to those supplied from the carboniferous limestone outcrops bordering the South Wales coalfield and in Pembrokeshire, Flintshire and Denbighshire.

South Wales may be divided into two parts, a northern mountainous district and a southern coastal region. The mountainous portion consists of a series of narrow valleys running from north to south in a south-easterly direction in the eastern part and a south-westerly direction in the western part. Coal-mining is the principal occupation, but metal manufacture is also an important industry, more particularly in east Carmarthenshire and the district around Swansea. The coalfield area extends from the western portion of Monmouthshire through Glamorgan to Carmarthenshire, and fringes the south of Breconshire. In the mining valleys, the villages and small towns spread themselves so as to form continuous chains of urban districts. The dividing hills form natural boundaries between one valley and the next. The south coastal region contains the larger towns of South Wales, including the county boroughs of Newport, Cardiff and Swansea. The export of coal contributes directly or indirectly to the livelihood of the majority of the people in the seaport towns. In the highly industrialised areas there is little scope for the employment of women in the heavy industries and there is practically no employment of married women.

To the west are the agricultural districts of Carmarthenshire and Pembrokeshire, deeply indented along the sea-coast by havens and bays. The country here cannot be described as mountainous, but is hilly enough in parts to make agriculture difficult. Prescelly Mountain in Pembrokeshire is the beginning of a range of mountains which limits the eastern border of Cardiganshire and spreads as a series of mountain ranges in Merionethshire and Caernarvonshire to culminate in the masses of Snowdonia.

The border counties of Radnor, Denbigh and Flint are mountainous also. Montgomeryshire, which stretches across Mid-Wales from the English border to the west, is fertile in the east, but hilly and less sheltered in its western portion. Anglesey and Pembrokeshire, jutting out into the sea, contain long stretches of flat coastal seaboard.

The economic depression in South Wales has added to the difficulties of the Local Authorities in providing effective maternity services. Heavy unemployment, with its corollary of high costs of public assistance, does not create a situation favourable to progressive public health development, and with a large section of the population living under conditions of distress, the health of the people in the Special Areas is a matter specially calling for close observation.

The rural counties of Wales are thinly populated except for the seaside resorts and the areas around the market towns in the valleys and plains, and the hilly nature of the country militates against easy intercourse with the populous industrial centres, which are generally situated at a considerable distance away.

This lack of close contact with the outside world adds to the difficulty of providing a comprehensive maternity service, and there is often a lack of appreciation by the country people of the value of such services as are available. The life of the rural population is hard, and often on the smaller agricultural holdings the woman shares with her husband the position of joint bread winner of the household.

The Birth-Rate.

Geographical Distribution of Births.

It follows that with the concentration of population in industrial South Wales and some parts of north-east Wales, most of the births occur in these areas. The more densely populated areas are better served as regards medical, nursing and ancillary services; moreover, facilities for treatment in case of emergency are closer at hand.

The contrast between the problem in South Wales and the rest of Wales can best be illustrated from births per area statistics. In 1934 there were 39,956 live births in Wales, of which 26,654, or 66.7 per cent., occurred in Glamorgan and Monmouthshire (with associated county boroughs) and the other one-third in the remaining 11 counties of Wales. For Wales there were 7.8 births per 1,000 acres, compared with 17.3 for England. In Glamorgan and Monmouthshire, however, the number of births per 1,000 acres was 30.6, while for the rest of Wales it was only 3.1. It will be seen from the detailed statistics set out in Appendix IV that for five counties of Wales (the counties of Brecon, Cardigan, Merioneth, Montgomery and Radnor) there were less than two births per 1,000 acres. It will readily be appreciated that not only are the difficulties of organising maternity services greater in the sparsely populated areas, but that the costs per head for equivalent services will be higher.

Fertility in Industrial and Rural Areas.

Women in rural Wales marry at later ages than the women in industrial Wales, and in the rural counties there is a larger proportion of single women among the adult female population (for statistics for 1931 for Wales I and II, see Appendix V). Appendix IV shows that the highest birth-rates in Wales are recorded for Glamorgan, Monmouthshire and the county boroughs, and the lowest for the three mountainous rural counties of Caernarvon, Cardigan and Merioneth. These rates, however, do not reflect the varying incidence of sex, age and marital condition in the populations. When these factors are eliminated, there is reason to believe that the fertility rate of the women is higher in the rural districts than in the industrial districts of Wales.

The following figures support this view. They give the mean annual number of births per 1,000 married women in the two

regions Wales I (mainly industrial) and Wales II (mainly rural)* for 1929-33:—

Age Period.	Wales I.		Wales II.	
	15-45	132	143	143
15-		376		432
25-		193		217
30-		114		139
35-		71		88
40-45		36		37

These figures are not based upon exact data, and must be regarded as furnishing only a rough index of fertility. In the calculations all births (legitimate and illegitimate) during 1929-33 have been taken, since separate figures for legitimate births in age periods are not known, but the rates are calculated on the number of *married* women (1931 Census). As regards age periods above 25, however, these factors have little influence, for the proportion of illegitimate births is small among women over 25 years of age. Another reason for caution in the study of the figures is that the age distribution of the births for 1929-33 is an estimate only, based upon a known proportionate age distribution of 26,641 births in Wales I and 8,442 births in Wales II in 1934 among women at ages 15-45 (for details see statement in the section "Mortality according to Age and Order of Pregnancy", page 52).

The figures do suggest, however, that the fertility rates are higher in the rural than the industrial areas of Wales, notwithstanding that the birth-rate expressed per unit of total population is generally speaking lower in the rural than the industrial counties.

Changes in the Birth-rate.

The birth-rate per 1,000 of the population for Wales and England and Wales for successive periods since 1891-1900 is given in the following Table:—

				Wales.	England and Wales.
1891-1900	...	...	...	32.3	29.9
1901-10	...	...	...	30.1	27.2
1911-20	...	...	...	24.6	21.8
1921-30	...	...	...	19.7	18.3
1931	...	...	...	16.3	15.8
1932	...	...	...	15.8	15.3
1933	...	...	...	15.4	14.4
1934	...	...	...	15.6	14.8

The number of live births in Wales has fallen from 57,426 in 1924 to 39,956 in 1934, or by 30.4 per cent., whereas the total population decline during the same period was 6.4 per cent. The decline in the number of births has been greater in South Wales than in North Wales, partly because of the extensive

* For a description of the regions Wales I and Wales II, see page 20.

migration of the young adult population from the coal mining valleys. One result of the substantial fall in the number of births, both in Wales and in England, is that a larger proportion of the total births are primiparous births and there is greater spacing of births. These factors would tend to increase the maternal risk, but on the other hand there are fewer cases of women who undergo the heavy strain of excessive childbearing. The possible influence of contraception on maternal mortality is discussed on page 58.

Sanitary Circumstances.

Of the four county boroughs in Wales, Cardiff and Newport are of comparatively modern growth. The standard of housing in these two boroughs is on the whole good. There is no crowding of houses on area, but overcrowding of persons in dwellings exists to some extent. Swansea is in parts older than the two county boroughs already mentioned and Merthyr Tydfil is older still.

Housing conditions in certain parts of Merthyr Tydfil are extremely bad. Crowded groups of old insanitary dwellings are found arranged in narrow courts or built back to back or built as over and under houses, the under houses being back to earth.

The four county boroughs have good water supplies, are well sewered, and are properly scavenged.

The sanitary circumstances of the various industrial areas in Wales vary. The worst housing conditions are found in areas where industry first came, which is more than a hundred years ago. Most of the houses in industrial Wales, however, have been built since 1870, and on the whole the standard of housing is not bad. Generally the houses are arranged in long rows of streets. The houses are self-contained, usually stone built, and contain two living rooms and three or four bedrooms. Through ventilation of the houses is the rule. There are few tenement houses or flats and little overcrowding of houses on space, but overcrowding of persons in dwellings is not uncommon.

Generally the districts are provided with good water supplies, good water carriage systems for excreta removal and satisfactory arrangements for removal of house refuse.

In the country districts, some of the cottages and farmsteads are placed in remote and almost inaccessible spots. Many of the rural cottages are old and small, possessing few rooms and these ill lighted and ill ventilated, while the sanitary arrangements are of primitive type and the water supply, derived from neighbouring wells and springs, is often of doubtful purity.

Many of the country towns have public water supplies and are sewered, and many of the larger villages have piped water supplies but depend on conservancy methods of excreta disposal.

Preliminary Statistical Observations.

Distinction between "Maternal" Mortality and "Puerperal" Mortality.

In discussions on mortality of women arising from pregnancy and childbirth it is not uncommon to find the two descriptions "maternal mortality" and "puerperal mortality" loosely applied without any clear understanding of the difference in meaning which for statistical purposes the two descriptive titles connote. It has, therefore, been thought desirable for the sake of clearness to state at the commencement of this report the classes of death which are covered by both titles according to the classification of the Registrar-General.

Puerperal deaths are deaths assignable to diseases of pregnancy, childbirth and the puerperal state, that is, deaths directly due to childbearing. In addition there are "deaths not classed to pregnancy but returned as associated therewith", or in other words, "deaths classed to non-puerperal causes". Non-puerperal deaths where childbirth was a contributory factor to death are classed under the principal cause of death, e.g. influenza, heart disease, or tuberculosis, etc., as the case may be, but a list of such deaths is given separately in the statistics of the Registrar-General and these deaths are usually known as "associated" deaths. The total of deaths directly due to childbirth and of deaths returned as associated therewith make up the maternal mortality. It should be added that statistics of "associated" deaths as distinct from "puerperal" deaths are only published by the Registrar-General for England and Wales as a whole, and it is not possible, therefore, to give separately from any official records the statistics of *maternal* mortality for Wales.

High Puerperal Mortality Rates in Wales.

The puerperal mortality rate for Wales has for many years been high. There are no parts of the country where it can be said that, taken over a period of years, a low rate has existed. In certain areas the rate has been exceptionally high, showing a larger excess over the average rate for England and Wales than is generally to be found in the worst areas in England.

Dame Janet Campbell, in her Report on Maternal Mortality, 1924 (Ministry of Health Reports on Public Health and Medical Subjects, No. 25), states that the puerperal death-rate in Wales has always been higher than that in England, and until recently (i.e. in 1924) than in Scotland; and she quotes puerperal death-rates per 1,000 live births for several countries for five successive periods to 1920. These death-rates are reproduced in the Table hereunder, but they should be read with some qualification. It is known, for example, that the puerperal death-rates for periods earlier than 1890 are of doubtful validity,

and since 1890 there have been several minor changes in classification. Moreover, the standard of certification has improved, and practices in certification may have differed in the several countries. In Scotland a high preference is given for assigning deaths to the puerperal class, and in Ireland a slightly different classification of deaths has been adopted.

Total Death-rates per 1,000 Births from all Causes connected with Childbearing.

Period.	England.	Wales.	Scotland.	Ireland.
1881-1890	... 4·64	6·10	5·45	7·07
1891-1900	... 4·96	6·94	4·72	6·60
1901-1902	... 4·43	6·89	4·95	6·21
1903-1910	... 3·75	5·26	5·30	5·45
1911-1920	... 3·95	5·43	6·00	5·17

For 1924-33 the puerperal mortality rate per 1,000 live births was 4·11 for England and 5·57 for Wales. The rate for Scotland was 6·37 and for Northern Ireland 6·19, but for the reasons already mentioned these rates are not strictly comparable with those for England and Wales.

The puerperal mortality rates for Wales and for England and Wales for the successive years from 1924 to 1935 are as follows:—

Year.	Wales.			England and Wales.		
	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.
<i>Rates per 1,000 live births.</i>						
1924	... 1·58	3·55	5·14	1·39	2·51	3·90
1925	... 1·58	3·39	4·97	1·56	2·52	4·08
1926	... 1·63	3·29	4·92	1·60	2·52	4·12
1927	... 1·64	4·14	5·78	1·57	2·54	4·11
<i>Rates per 1,000 total births.</i>						
1928	... 2·07	3·72	5·79	1·72	2·52	4·25
1929	... 1·80	3·77	5·58	1·73	2·43	4·16
1930	... 1·96	3·34	5·30	1·84	2·38	4·22
1931	... 1·78	3·34	5·13	1·59	2·35	3·94
1932	... 1·69	4·23	5·91	1·55	2·49	4·04
1933	... 2·06	3·69	5·75	1·75	2·57	4·32
1934	... 2·75	3·86	6·61	1·95	2·46	4·41
1935	... 2·27	3·62	5·89	1·61	2·32	3·93

It will be observed that while the Welsh mortality rates show an excess over the rates for England and Wales both for puerperal sepsis and for other puerperal causes, the excess is much greater for causes other than sepsis than for sepsis.

An inquiry was made by Dr. Dilys M. Jones (then a Medical Officer of the Welsh Board of Health) in 1931 into the high incidence of maternal mortality in certain counties of Wales.

Her report was published in 1932 as part of the Report on High Maternal Mortality in certain areas of England and Wales (Ministry of Health Reports on Public Health and Medical Subjects, No. 68).

Dr. Dilys Jones' inquiry covered ten counties in Wales which during the period 1923-9 had an average puerperal death-rate of more than 5 per 1,000 live births. In her report she discusses the various factors which have influenced the high puerperal death-rates in Wales, and describes the arrangements for maternal care made by the Local Authorities in each of the ten counties. The inquiry was undertaken partly as a routine investigation for the Minister of Health and partly for the information of the Maternal Mortality Committee, and was general rather than clinical in character.

There seems little doubt that the conditions of life of the people have contributed to the consistently high puerperal death-rate in Wales. The population in the mining valleys is of the industrial type, and in the rural parts modern ideas of health improvement and of personal hygiene are slow to gain acceptance, and efficient maternity services are difficult to establish. It might be expected that these factors would operate unfavourably in the efforts to reduce puerperal mortality.

A point of importance which is dealt with at some length later in this report is that there is reason to believe that the amount of ill-health and disability among the women of Wales is excessive and that this excess accounts in some measure for the high death-rate among mothers in childbirth. It is of special significance that puerperal mortality is highest in those regions of England which show high death-rates from all other causes among women of childbearing age and lowest in those regions where the non-puerperal death-rate is lowest.

The Problem in Perspective.

The mean annual number of deaths from puerperal causes in Wales during 1924-33 was 262. This number compares with 2,676 as the mean annual number of deaths of females aged 15 to 45 (married and single) from all causes during the same period.* Puerperal mortality thus accounts for about 10 per cent.† of the total mortality among women of childbearing age. This proportion, though sufficiently serious to invite national attention, should not blind us to the fact that the number of

* The number of females aged 15-45 in Wales at the 1931 census was:—

	<i>Single.</i>	<i>Married.</i>	<i>Widowed.</i>	<i>Divorced.</i>	<i>Total.</i>
15-25 ...	180,304	32,321	172	11	212,808
25-45 ...	92,994	279,061	11,317	379	383,751
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	273,298	311,382	11,489	390	596,559

† The percentage (on deaths 1924-33) for age group 15-25 was 6.2, and for age group 25-45, 11.2 per cent.

deaths each year from puerperal causes is small in comparison with the number of deaths of a more or less preventable nature from other groups of causes.

It may not be out of place to remark that the number of fatal road accidents in Wales in recent years has exceeded 300 a year.

A mortality rate of 5 per 1,000 births has its opposite in the fact that in 995 cases out of every thousand the woman survives pregnancy, and potential mothers should be encouraged to look upon the physiological function of childbearing in that light. The causes for concern are that deaths of a preventable nature occur, that the incidence of puerperal morbidity is high, that the women who suffer are in the prime of life, and that more than one life is at stake.

It is not intended, therefore, to minimise the gravity of the risk which maternity involves, but merely to put in a plea for a consideration of the position in proper perspective. The public should be stimulated to a knowledge that there is much preventable morbidity and mortality and that remedial measures are urgent. But the alarmist pictures so often presented only serve to give an exaggerated or distorted view of the true position and can well be productive of harm.

*Puerperal Mortality and Neo-natal Mortality, 1924-33, and
Stillbirth Frequency, 1928-33, for the Administrative
Counties and County Boroughs of Wales.*

Administrative Area.	1924-33.			Puerperal Mortality rate per 1,000 Live Births.	Puerperal Mortality rate per 1,000 Live Births.	Neo-natal (0-4 weeks) Death-rate per 1,000 Live Births.	Stillbirth Frequency per 1,000 total Births.			
	No. of Live Births.	No. of Puerperal Deaths.†	1924-33.							
			1924-28.	1929-33.						
<i>Counties.</i>										
Anglesey	7,958	54	6.79	7.30	6.19	37	57			
Brecon	10,040	45	4.48	4.84	4.03	35	57			
Caernarvon	17,608	89	5.05	5.30	4.78	35	53			
Cardigan	7,511	48	6.39	6.96	5.74	35	57			
Carmarthen	30,438	193	6.34	6.05	6.70	38	59			
Denbigh	26,051	171	6.56	6.50	6.63	38	53			
Flint	19,000	107	5.63	5.56	5.72	31	48			
Glamorgan	149,264	873	5.85	5.51	6.29	37	57			
Merioneth	6,848	40	5.84	5.67	6.04	32	58			
Monmouth	67,532	350	5.18	4.36	6.19	36	55			
Montgomery	8,396	40	4.76	4.34	5.28	37	51			
Pembroke	14,742	84	5.70	4.08	7.52	32	45			
Radnor	3,602	19	5.27	5.71	4.77	35	49			
<i>County Boroughs.</i>										
Cardiff	40,648	193	4.75	4.95	4.50	34	50			
Merthyr Tydfil	13,024	76	5.84	6.18	5.37	39	68			
Newport	17,348	70	4.04	4.34	3.67	38	42			
Swansea	29,720	164	5.52	5.63	5.39	35	54			
<i>Wales.</i>										
*Wales I (Industrial South Wales)	469,730	2,616	5.57	5.34	5.85	36	55			
*Wales II (Rest of Wales)	358,014	1,964	5.49	5.24	5.79	36	55			
England and Wales	111,716	652	5.84	5.68	6.01	35	52			
England	6,568,467	27,664	4.21	4.12	4.31	32	41			
	6,098,737	25,048	4.11	4.02	4.20	32	40			

* For a description of the regions Wales I and Wales II, see page 20.

† The numbers of deaths in each of the two periods 1924-8 and 1929-33 are given in Appendix IX.

Puerperal Mortality, Neo-natal Mortality and Stillbirth Frequency in the Counties and County Boroughs.

The preceding Table shows the death-rates from puerperal causes for each administrative county and county borough in Wales for 1924-33. The neo-natal mortality rate (i.e. of infants 0-4 weeks) for 1924-33 and the stillbirth frequency for 1928-33 are also given. Stillbirths were not made registrable until July, 1927.

For the period 1924-33 the puerperal mortality rate for Wales was 35 per cent. in excess of the rate for England. For neo-natal mortality the Welsh excess was about 12 per cent. and the Welsh stillbirth frequency (1928-33) was 38 per cent. above the English figure.

The statistics show that every county and county borough in Wales except Newport County Borough had a puerperal mortality rate higher than that for England, and that all the 17 areas had a higher stillbirth frequency. Except for Flintshire, Merionethshire and Pembrokeshire also, all the Welsh areas show higher neo-natal death-rates, but the excesses of neo-natal mortality are not pronounced. One may conclude from the Table that there is an association between high puerperal mortality incidence and a high stillbirth frequency, and that it is not uncommon to find a high neo-natal mortality rate where puerperal mortality is high.

It will be observed from the Table that of the 17 Welsh administrative areas only two (Glamorgan and Monmouthshire) show an annual average number of puerperal deaths exceeding 20. For Radnorshire there were less than two puerperal deaths per annum, and for four other counties the average was less than five. It will be obvious that in such cases a death-rate based on a single year's figures is a quite unreliable index of puerperal mortality, and even a rate based on puerperal deaths over a period of years is often not free from the same criticism. To take the county of Radnor (a small county) as an example, there were four deaths in 1929 and one death in each of the four successive years, giving a total of eight deaths in five years. One additional death in the five-year period would have increased the death-rate of 4.77 shown in the Table by 12.5 per cent.

Again, studying the neo-natal death-rates and the stillbirth frequencies for the Welsh counties, it will be seen that Pembrokeshire shows the lowest stillbirth frequency and the lowest but one neo-natal death-rate of any county. This favourable position suggests that the puerperal mortality rate might also be relatively low. Pembrokeshire does, in fact, show for 1924-8 the lowest rate of any of the 17 Welsh areas. Yet for the next five-year period (1929-33) Pembrokeshire records the highest

puerperal mortality rate of all the 17 areas. The excess mortality for the county occurred in 1931 and 1932, when for each year there were 14 puerperal deaths, giving the excessively high death-rate of 10.16 per 1,000 live births for the two years. Of the 28 puerperal deaths in these two years 22 were from causes other than sepsis. This example is a further instance of the way in which puerperal mortality rates may vary considerably even when the mortality rate is calculated on figures for a period of years and on a fair sample of deaths. In Pembrokeshire there were 32 deaths during 1924-8 and 52 deaths during 1929-33.

Increases and Decreases in Mortality.

The puerperal mortality rate per 1,000 live births for Wales was 5.34 for 1924-8 and 5.85 for 1929-33. Between the two periods, therefore, there was a recorded increase in mortality of 9.6 per cent.

In all the four county boroughs there was an appreciable decrease in the mortality rate, but Glamorgan and Monmouthshire, the two most industrialised counties of Wales, show substantial increases (an increase of 14.2 per cent. for Glamorgan and 42.0 per cent. for Monmouthshire). The counties of Brecon, Carmarthen, Denbigh and Flint are partly industrial and partly rural, and increased mortality is shown for three of these four counties and a decrease for one county (Brecon). The remaining seven counties of Wales can be regarded as almost wholly rural, and increases and decreases in mortality are shown as follows:—

Counties showing Increases.

Merioneth
Montgomery
Pembroke

Counties showing Decreases.

Anglesey
Caernarvon
Cardigan
Radnor

The upward and downward variations in mortality are in some cases slight, and as already pointed out, it is inadvisable to regard the rates for some counties as furnishing anything more than an approximate measurement of mortality incidence. The general conclusion from the figures is that mortality has declined in the county boroughs but has increased noticeably in the highly industrialised areas, while in the rural areas a roughly stationary position is suggested. In considering the position in the industrial areas regard must be had to the factor of abortion. There is strong reason to believe that the practice of encouraging and procuring abortion has increased in recent years. This matter is dealt with at length in the chapter on "Abortion" (page 68).

Improved Standard of Certification.

The increase of 9.6 per cent. in the puerperal mortality rate for Wales may be more apparent than real. It is well known

that the rate for England as well as for Wales has shown a tendency to increase, but it is believed that there has been a coincident improvement in the standard of certification. The more accurate information now asked for by the Registrar-General through the introduction of a revised form of death certificate in 1927, and the inquiries he makes of practitioners where insufficient information is given on the certificates, have helped to improve certification. The effect of better certification has been to increase the number of deaths directly assignable to puerperal causes; or, expressed in another way, there has been in past years an under-statement of the true death-rate from puerperal causes, which in degree may still be continuing. Under-statement has probably been greater in the rural areas, where diagnosis is perhaps less accurate on account of the scarcity or lack of maternity beds and the insufficiency of the arrangements for obtaining pathological examinations and the services of consultants.

The increased attention which is being paid by public health authorities to the subject of maternal mortality has also, no doubt, contributed to improvement in the standard of certification. During the course of the investigations into maternal mortality in Wales the case records of 1,079 deaths were examined (see page 47). Of these deaths 853 had been recorded in the official statistics of the Registrar-General as due to puerperal causes, and 196 as due to "associated" causes, while in 30 cases no mention of pregnancy was made on the death certificate. Examination of the case histories suggested that 941 of these 1,079 deaths were directly due to childbirth and should, therefore, have been classed as puerperal. That is to say, on the cases investigated the true puerperal death-rate had been under-stated to the extent of 10·3 per cent. The 1,079 deaths investigated were a representative sample of the maternal deaths which occurred in Wales during the same period. It is reasonable to assume that if there was an under-statement of puerperal mortality in Wales by as much as 10 per cent. during 1929-34 (the period to which the 1,079 deaths relate) the percentage under-statement for previous years, when certification was probably less satisfactory, would have been greater still.

Thus, too much importance should not be attached to the fact that the puerperal mortality rate for Wales increased between 1924-8 and 1929-33 from 5·34 to 5·85 per 1,000 live births, that is, by 9·6 per cent. The actual increase, after allowing for improvement in certification, may well have been less. It would be unwise to make anything more than a general statement on this question, for accurate computation is impossible, but it seems desirable that the general public should know that the increase in the recorded puerperal mortality in certain areas as shown in the official statistics does not necessarily

justify the inference that the risks of a mother dying in childbirth have been increasing.

One further observation should be made. It has been shown that puerperal mortality has decreased in all the four county boroughs of Wales and has remained practically stationary in the rural parts. But if, as is probable, there has been greater under-statement of the puerperal mortality rate in the rural districts in the past, it is possible that the incidence of puerperal mortality is on the decline in parts of rural Wales as well as in the county boroughs.

Statistics according to Regional Grouping.

In any detailed investigation into the causes of puerperal mortality in Wales a larger unit than the county or the county borough should be taken for most statistical purposes. As already pointed out, comparisons of the rates for individual areas may be unreliable even when total puerperal mortality rates are being considered. The number of deaths in many counties is so small that wide fluctuations occur from year to year. These variations become even greater when the causes of puerperal death are analysed in sub-divisions of the puerperal class (abortion, sepsis, haemorrhage, toxæmias, etc.), or when age groupings or parity groupings are taken. In such cases the number of puerperal deaths in the individual counties and county boroughs is usually much too small to enable proper comparison to be made. A reference to Appendix VI shows that even for a period of ten years (1924-33) the number of deaths under the separate causes of puerperal death was in many counties not above five.

A grouping of county areas has, therefore, been taken and most of the statistics are given for two fairly well defined regions of Wales, presenting two extremes of type as regards industrial characteristics. In some cases even a division of Wales into two regions hardly provides a sufficiently large sample of deaths in each grouping for accurate statistical treatment, and in such cases statistics have been given for the country as a whole.

In one Table (Appendix XV), figures are given for four separate classes of area, namely:—

- (a) industrial counties (2);
- (b) semi-industrial counties (4);
- (c) rural counties (7);
- (d) county boroughs (4).

Regional Grouping into Wales I and Wales II.

The two regional areas selected on account of their differing industrial characteristics may broadly be defined as (1) an industrial region, embracing roughly the South Wales coalfield,

and (2) the rest of Wales, situated north of this region, and containing large mountainous or hilly tracts, and with agriculture as the main occupation of the people.

The Registrar-General has from 1931 adopted a regional classification of Wales into the above two groups for the purpose of census and other vital statistics. It has been found convenient, therefore, to use the same regional grouping in the examination of statistical data relating to maternal mortality in Wales.

For simplicity the South Wales region is termed region Wales I and the rest of Wales region Wales II, and these designations are used throughout this report. The counties embraced in each region are:—

Wales I.

Glamorgan (with the county boroughs of Cardiff, Swansea and Merthyr Tydfil);

Monmouth (with the county borough of Newport);
Brecon and Carmarthen.

Wales II.

Anglesey, Caernarvon, Cardigan, Denbigh, Flint, Merioneth, Montgomery, Pembroke and Radnor.

It should be pointed out that roughly three-quarters of the population of Wales live in region Wales I, so that where rates for Wales as a whole are given the figures will generally to a considerable extent reflect also the position in industrial Wales. As regards areal size, however, region Wales I comprises rather less than two-fifths of the surface of Wales.

The actual figures of population and acreage are:—

	<i>Population,</i> <i>1934.</i>	<i>Acreage.</i>	<i>Density of Population per square mile.</i>
Wales I	... 1,867,000	1,928,000	620
Wales II	... 687,400	3,202,000	137
Wales	... <u>2,554,400</u>	<u>5,130,000</u>	<u>319</u>

This regional grouping does not provide an exact division of the country into the two classes of area industrial and non-industrial. Glamorgan may for all practical purposes be regarded as wholly industrial, but the east of Monmouthshire, the west of Carmarthenshire and northern Breconshire contain large rural sections. Furthermore, as regards region Wales II (rural Wales), there are important industries carried on in the coalfield areas of Denbighshire and Flintshire. To a lesser extent, also, in regard to the numbers employed, there is the slate-quarrying industry in Caernarvonshire and Merionethshire. A regional division following established county boundaries is,

however, the only division that can be taken for statistical analysis in most cases, as some figures are not available for a smaller unit of administration than the county or county borough.

In order to determine whether the mortality statistics for Wales I were representative of industrial Wales and those for Wales II of rural Wales a comparison has been made of the statistics

(a) for the two geographical regions designated by the Registrar-General Wales I and Wales II;

(b) for two groupings of areas corresponding fairly closely with regions Wales I and Wales II, but selected more exactly according to industrial characteristics. For convenience these latter groupings of areas are referred to hereunder as "Industrial Wales" and "Non-Industrial Wales".

Area Grouping into "Industrial Wales" and "Non-Industrial Wales".

A list of the local government areas constituting the two classes of area "Industrial Wales" and "Non-Industrial Wales" mentioned in (b) above is shown in Appendix II. Briefly, however, the course followed was to group the rural portions of region Wales I with region Wales II less the industrial portions of Denbighshire and Flintshire; and to group the industrial portions of Denbighshire and Flintshire with the purely industrial section of region Wales I. Broadly, "Industrial Wales" represents the South Wales coalfield area, the county boroughs, and the industrial areas of Denbighshire and Flintshire, and "Non-Industrial Wales" constitutes the rest of Wales.

The effect of this re-grouping as regards population, births and acreage is shown in the following Table:—

	Wales I. Areas regarded as		Wales II. Areas regarded as	
	(a) Indus- trial.	(b) Non- Industrial.	(a) Indus- trial.	(b) Non- Industrial.
Population, 1934...	1,732,000	135,000	161,000	526,400
Live Births, 1924— 33	336,094	47,775	29,509	56,352
Area (in acres) ...	941,000	987,000	167,000	3,035,000
Density of popula- tion per square mile	1,177	87	617	111

The population and acreage of the two regions "Industrial Wales" and "Non-Industrial Wales" are thus:—

	<i>Population, 1934.</i>	<i>Acreage.</i>	<i>Density of Population per square mile.</i>
Industrial Wales	1,893,000	1,108,000	1,093
Non-Industrial Wales ...	661,400	4,022,000	105
Wales ...	<u>2,554,400</u>	<u>5,130,000</u>	<u>319</u>

The re-grouping makes little difference as regards population numbers, but there is a considerable difference between the density of population of region Wales I (620 persons per square mile) and Industrial Wales (1,093 persons per square mile).

Statistics for Wales I and Wales II and for "Industrial Wales" and "Non-Industrial Wales" compared.

The figures in the first of the two preceding Tables show (1) that of the total population of 1,867,000 in Wales I, all but 135,000 live in areas industrial in character, and (2) that of the total population of 687,400 in Wales II, which embraces the rural counties, 161,000, or roughly one-fourth, live under industrial conditions. Wales I is therefore more representative of industrial conditions than Wales II is of rural conditions. Indeed, at first sight it may seem that Wales II is not fairly representative of rural life owing to this not inconsiderable industrial element in its population. The industrial parts of Wales II, however, are less urban in character than the industrial parts of Wales I, and it will be seen that they have a much lower density of population. Nearly all the non-industrial areas of Wales I are near centres of industry, while in Wales II most of the non-industrial population are in remote villages or are concentrated in the residential seaside resorts or market towns. In the whole of region Wales II there is not one urban district with a population exceeding 25,000, and there are only two rural districts having a population exceeding this number, namely, the Wrexham Rural District in Denbighshire (population 64,000) and the Hawarden Rural District in Flintshire (population 27,000). Both these areas have been treated as industrial.

While, therefore, a division of Wales into the two classes of area industrial and non-industrial would give a sharper contrast between industrial and rural conditions than the regional grouping Wales I and Wales II, this latter grouping does present the contrast to a reasonable degree. As already pointed out, no more convenient grouping was possible for most of the statistics.

Detailed statistics of the number of births and of puerperal deaths, and the death-rates for 1924-8 and 1929-33 in the several administrative counties and county boroughs of Wales, classified under the headings "Industrial" and "Non-Industrial", are given in Appendices VIII to XI. Appendix VIII gives the number of live births (legitimate and illegitimate), Appendix IX the number of puerperal deaths, arranged under group causes, and Appendices X and XI the puerperal death-rates per 1,000 live births.

The puerperal death-rates per 1,000 live births for the two regions Wales I and Wales II and for "Industrial Wales" and "Non-Industrial Wales" are shown in the following Table:—

Region.	1924-1928.				1929-1933.			
	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 148-150).	All Causes (140- 150).	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 148-150).	All Causes (140- 150).
Industrial Wales ...	1.73	1.38	2.22	5.33	2.06	1.60	2.28	5.94
Wales I (four industrial counties of South Wales)	1.65	1.38	2.20	5.24	1.97	1.58	2.25	5.79
Non-Industrial Wales ...	1.49	1.56	2.32	5.37	1.66	1.40	2.50	5.56
Wales II (Rest of Wales)	1.76	1.53	2.40	5.68	1.94	1.50	2.57	6.01

Note.—The numbers 140 to 150 at the head of the columns denote the list number of the disease as shown in the Registrar-General's classification.

The differences shown as between region Wales I and "Industrial Wales" are very small and are negligible except for sepsis. Larger differences are shown as between region Wales II and "Non-Industrial Wales", but the death-rates for these latter regions are calculated on a smaller number of deaths. Generally it can be said that death-rates for region Wales I do fairly indicate the level of mortality in the industrial areas of Wales, and that death-rates for region Wales II are on the whole representative of mortality in the rural areas. The death-rates for "Industrial Wales" are higher than those for Wales I and the death-rates for "Non-Industrial Wales" are lower than those for Wales II. The sepsis death-rate is appreciably lower for "Non-Industrial Wales" than for Wales II, but the differences for other puerperal causes are not pronounced. It will be observed that the range of variation in the death-rates for the two classes of area industrial and non-industrial is generally speaking not large, if sepsis be excluded.

Puerperal Mortality in Industrial and Rural Areas.

While, however, the puerperal mortality rates for "Industrial Wales" and "Non-Industrial Wales" show a close correspondence, there are some interesting differences in the rates for individual areas within the respective groups of areas industrial and non-industrial. In the following Table, which

summarises the statistics detailed in Appendices IX and X, the differences in the rates for various parts of industrial and rural Wales are well brought out. The death-rates are expressed per 1,000 live births, and the figures in brackets denote the number of puerperal deaths on which the calculations are based:—

Area.	Industrial.		Non-Industrial.	
	1924-8.	1929-33.	1924-8.	1929-33.
County Boroughs ...	5.21 (286)	4.73 (217)	—	—
Glamorgan (treated as wholly industrial) ...	5.51 (464)	6.29 (409)	—	—
Monmouthshire ...	4.41 (144)	6.51 (173)	4.02 (18)	3.96 (15)
Carmarthenshire ...	5.66 (67)	7.48 (68)	6.98 (36)	5.06 (22)
Breconshire	6.64 (22)	5.82 (15)	2.21 (5)	1.59 (3)
Denbighshire	6.47 (54)	6.63 (47)	6.55 (37)	6.64 (33)
Flintshire	5.98 (45)	5.65 (37)	4.31 (11)	5.90 (14)
Rest of Wales (treated as wholly rural) ...	—	—	5.40 (192)	5.86 (182)
Wales	5.33 (1,082)	5.94 (966)	5.37 (299)	5.56 (269)

Except for the county boroughs, which show a decreased death-rate, the puerperal mortality rates for the industrial parts of South Wales were high in 1929-33, and had increased since 1924-8 (apart from Breconshire, where the number of deaths is small). In contrast the rates in 1929-33 for the rural parts of Monmouthshire, Carmarthenshire and Breconshire—situated near the South Wales coalfield—were appreciably lower and had decreased. It is in the non-industrial parts of South Wales and in the county boroughs that puerperal mortality is lowest. In most cases, however, the rates for the non-industrial areas are based on a small number of deaths, and are not, therefore, free from an element of unreliability.

Broadly the statistics for Glamorgan and the industrial parts of Monmouthshire and Breconshire represent the puerperal death-rate in the Special Areas of Wales, and the Table shows that it is in these areas and in industrial Carmarthenshire that, generally speaking, puerperal mortality is highest and has increased most. This subject is discussed in more detail in the chapter on "Maternal Mortality in the Special Areas" (page 87).

Very high puerperal mortality rates are shown for Denbighshire (industrial and non-industrial areas) in both periods, and the rates are also high for Flintshire.

As regards the non-industrial areas, the rates are lower in the South Wales areas than in the other parts of non-industrial Wales. Moreover, in South Wales alone, of the non-industrial groups, is improvement recorded between 1924-8 and 1929-33. The rates for rural Breconshire are exceptionally low, but the number of deaths here is too small to be of any statistical significance.

II.

THE MATERNITY SERVICES.

In this section of the report particulars are given of the various services available to women during pregnancy, labour and the puerperium, with particular reference to the services provided by public authorities, and the extent to which these services are used. The problems presented to the different authorities vary widely in view of the differing nature and circumstances of their areas. Maternity schemes have been developed only in the two industrial counties of Glamorgan and Monmouthshire, the four associated county boroughs (Cardiff, Merthyr Tydfil, Swansea and Newport) and the county of Flint. In the rest of Wales, which is mainly rural, very little work is undertaken by Local Authorities for maternal care either during the ante-natal period or at the confinement.

Ante-natal Services.

The investigation commenced in May, 1935, and the services described are those which were found during visits to the areas. No figures are, therefore, given in the Tables for a later period than the year 1934. In many areas services were being inaugurated or extended as a result of Memo. 156/M.C.W., issued by the Minister of Health in December, 1930, and there appeared to be some awakening to the necessity for the care of the expectant mother.

Growth of Clinics between 1924 and 1934.

Prior to 1924 few public health authorities in Wales had established ante-natal clinics in their areas. In 1924 there were eight ante-natal clinics in the country; particulars are given in the following Table:—

Ante-natal Clinics, 1924.

Administrative Area.	No. provided by		Total.	No. of Expectant Mothers who attended.*
	Council.	Voluntary Associations.		
<i>Counties.</i>				
Carmarthen (Llanelli)	1	—	1	104
Glamorgan (Aberdare, Penarth)	1	1	2	520
<i>County Boroughs.</i>				
Cardiff ...	1	—	1	1,040
Merthyr Tydfil ...	1	—	1	364
Newport ...	1	—	1	520
Swansea ...	2	—	2	2,028
Wales	7	1	8	4,576

* Information as to the number of attendances made by the expectant mothers was not available.

Thus in 1924, outside Glamorgan, Carmarthenshire and the four county boroughs there were no ante-natal clinics in Wales, and the provision made in these areas was quite inadequate, only 4,576 mothers (compared with approximately 57,000 births) attending.

By 1934 the number of clinics had increased to 87. This increase was almost entirely due to the opening of centres in the industrial counties of Glamorgan and Monmouthshire, expansion of the work in the county boroughs, and the establishment of clinics in Flintshire. Of the 87 clinics, 78 were in Glamorgan and Monmouthshire and six in Flintshire. The only other clinics were two in Denbighshire and one in Carmarthenshire. In 1934 eight counties were still without ante-natal clinics, compared with 11 counties in 1924. The following Table shows the distribution of these centres; the geographical situation of these clinics is further shown in the map at the end of this report.

Ante-natal Clinics, 1934.

Administrative Area.	Number of Clinics.*	Number of notified Births, 1934.	Number of Expectant Mothers who attended.	Number of attendances by Expectant Mothers.	Number of Expectant Mothers who attended as a percentage of notified Births.
Per cent.					
<i>Counties.</i>					
Anglesey ...	—	732	—	—	—
Brecon ...	—	793	—	—	—
Caernarvon ...	—	1,577	—	—	—
Cardigan ...	—	655	—	—	—
Carmarthen ...	1	2,513	98	158	3·9
Denbigh ...	2	2,251	124	353	5·5
Flint ...	6	1,647	864	2,736	52·5
Glamorgan ...	43	12,759	4,763	12,239	37·3
Merioneth ...	—	571	—	—	—
Monmouth ...	16	5,850	1,840	4,093	31·5
Montgomery ...	—	725	—	—	—
Pembroke ...	—	1,305	—	—	—
Radnor ...	—	296	—	—	—
<i>County Boroughs.</i>					
Cardiff ...	5	3,632	1,669	7,097	46·0
Merthyr Tydfil	4	1,095	657	2,031	60·0
Newport ...	7	1,607	746	3,772	46·4
Swansea ...	3	2,701	1,142	6,749	42·3
Wales	87	40,709	11,903	39,228	29·2

England and Wales ... 42·1

* All the Clinics were provided by the Council; none by a voluntary association.

The Table shows that 11,903 expectant mothers, representing 29.2 per cent. of the notified births, took advantage of facilities offered by the public authority for ante-natal care. The Welsh percentage of 29.2 is much below the English percentage of 42.1.

The Work of the Clinics.

In two counties very little work was done at the clinics. Of the eight counties which still had no clinics Brecon, Radnor and Anglesey had adopted a scheme by which uninsured pregnant women who have engaged a midwife for the confinement might be examined by a general practitioner. From January, 1934, to the time of the visit in July, 1935, 12 patients had taken advantage of the scheme in Brecon, and in Radnor during 1934, 59 first examinations and 42 second examinations had been made under the scheme. In Anglesey 20 women were examined during 1935. There are obvious difficulties in the way of establishing ante-natal clinics in rural areas, and it is unlikely that they would be used by many people, but there is an urgent need for some alternative provision for ante-natal care. Medical Officers of Health stated repeatedly that owing to a natural reserve the Welsh mother would not attend a public clinic during pregnancy. In Flintshire, however, village mothers showed no such reluctance in attending clinics, and a number of mothers, representing more than one-half the total notified births, attended the clinics during 1934.

The value of the work done at the clinics varied. In some of the counties and in the county boroughs, clinics were run by experienced whole-time Medical Officers who were able to refer difficult cases to a consultant. The work done at these clinics was good and showed promise of further development. Certain features of the service, however, called for criticism. In the first place inadequate provision of ante-natal beds in association with these clinics limits the usefulness of the clinics from the preventive point of view. In a clinic in a large town, for example, a woman in poor circumstances suffering from a severe degree of albuminuria was sent home because a bed was not available at the associated hospital. Other similar cases were cited by Medical Officers. A large number of the clinics had no ante-natal beds at all at their disposal.

At a number of clinics far too many cases were seen at one session, and the efficiency of the work suffered in consequence. Frequently 40 or more cases were seen by the Medical Officer at a session, lasting roughly $2\frac{1}{2}$ hours. Urine was tested by the nurse for albumin only and the likelihood of pus, sugar and acetone being present was not considered. Owing to lack of time, insufficient attention was also given to the diet of the mother and to her general condition, and symptoms were not

investigated or else the investigation was not carried far enough. The general physical examination, too, was frequently very cursory. A sympathetic discussion of matters relevant to the pregnancy would often have been of great help to the patient.

The following Table shows the average number of attendances in 1934 made by those mothers who took advantage of the facilities offered at ante-natal clinics. The average number of attendances per mother for Wales was 3.3, and all the five counties in which ante-natal clinics had been established show a figure below this average; this number is too small for much effective preventive work to be done.

Average No. of attendances made by each expectant mother who attended Ante-natal clinics in 1934.

Counties*.			County Boroughs.			
Carmarthen	...	1.6	Cardiff	...	...	4.3
Denbigh	...	2.8	Merthyr Tydfil	...	...	3.1
Flint	...	3.2	Newport	...	...	5.1
Glamorgan	...	2.6	Swansea	...	...	5.9
Monmouth	...	2.2				
Wales	...	...	...	...	...	3.3

* No clinics exist in eight counties.

To secure full usefulness from the ante-natal clinics it is necessary that they should attract the mothers and be closely linked with the work of the local midwives and with general practitioners. Effective linkage was seldom found. In some areas midwives were asked to bring their patients to the clinics, but outside the county boroughs very few cases were referred to clinics by the midwives. Again, it is the custom at most centres for a report to be sent to the midwife or doctor who is to attend the confinement only if any abnormality is diagnosed by the Medical Officer. Closer co-operation between the clinics and those who are to attend the confinement would result if a report were sent in all cases, even though the findings were negative. By such a procedure the clinics would gain the support and goodwill of practitioners and midwives.

Very little attention was given at the clinics to education of the mothers in matters of health and hygiene, and in many of the clinics this side of the work was entirely neglected. Educational work is obviously of the utmost importance, and the contact with the mother formed at the clinic provides an opportunity for giving help and advice in a simple way. Until intelligent co-operation on the part of the mothers is obtained in the measures necessary for the safe conduct of pregnancy, the clinics must fail in their purpose.

Home Visiting of Expectant Mothers by Health Visitors.

Home visiting of the expectant mother was not done adequately or systematically. The Table below gives particulars of visits paid to expectant mothers during 1934.

Administrative Area.	No. of Births notified.	No. of first visits to Expectant Mothers.	No. of first visits to Expectant Mothers as a percentage of notified Births.	Average No. of visits paid to these Expectant Mothers.
<i>Counties.</i>				
Anglesey	732	522	71.3	5.2
Brecon	793	292	36.8	3.8
Caernarvon	1,577	1,089	69.1	4.7
Cardigan	655	454	69.3	6.0
Carmarthen	2,513	1,622	64.5	3.5
Denbigh	2,251	393	17.5	2.1
Flint	1,647	305	18.5	1.5
Glamorgan	12,759	3,879	30.4	2.4
Merioneth	571	124	21.7	2.2
Monmouth	5,850	298	5.1	2.6
Montgomery	725	556	76.7	4.6
Pembroke	1,305	754	57.7	3.1
Radnor	296	299	101.0	4.5
<i>County Boroughs.</i>				
Cardiff	3,632	120	3.3	1.5
Merthyr Tydfil	1,095	514	46.9	1.8
Newport	1,607	542	33.7	1.4
Swansea	2,701	333	12.3	1.3
Wales	40,709	12,096	29.7	3.1

It should be pointed out that in the rural areas midwives also act as part-time health visitors, and ante-natal visits paid by them to an expectant mother in the capacity of midwife are also frequently entered in the records as visits in the role of health visitor. In the county boroughs, on the other hand, the visits are mainly follow-up visits from the clinic paid by the whole-time health visitor at the request of the Medical Officer of the clinic.

Comment is also necessary on the following-up system. Usually when the mother does not keep an appointment at the clinic a postcard is sent asking her to attend at the next session, and if she fails to attend a visit is paid. Much valuable time may be lost by this method where the mother has been unable to attend on account of some illness, possibly connected with the pregnancy.

There is need of much closer co-operation between the clinics and hospitals, consultants, doctors, midwives and health visitors. Until this is achieved the clinics are not likely to play a very important part in the prevention of maternal mortality.

Consultant Ante-Natal Clinics.

No authority had provided an *ad hoc* consultative clinic, but most authorities which provided ante-natal clinics had made arrangements whereby difficult cases could be referred to a consultant obstetrician.

Beds reserved for Ante-Natal Cases.

Although ante-natal cases were admitted to hospital in areas where maternity beds were available, beds were not specially reserved for them. At Swansea, however, bookings were so arranged at each of the two maternity hospitals that two beds were always reserved for abnormal ante-natal cases.

Midwives.

During the investigation over 300 midwives were visited and the records of 1,261 midwives examined. Thus a fairly accurate opinion of the standard of their work could be formed. There was wide variation in the training and general education of these women. Those who were trained nurses and in addition held the certificate of the Central Midwives Board were almost invariably of a better general education than those who held the C.M.B. certificate alone, whether or not they were employed by a voluntary association. There was no doubt, however, that the midwives employed by a voluntary association conformed to a higher all round standard than those not so employed. There was more uniformity about their technique in the management of cases. They insisted on early booking, demanded certain definite preparations by the patient for the confinement and conducted frequent ante-natal examinations, including the testing of urine. Lysol was the antiseptic in general use by the nurses but dettol was growing in popularity, and many of the nurses were using it in every case. Few of the nurses wore masks or gloves.

Midwives employed by Voluntary Associations.

In many rural areas the voluntary association provided the nurses with a car or motor-cycle so that cases could be reached quickly. On the whole the partially trained women employed by a voluntary association, that is, the midwives who in addition had received a village-nurse training, were good at their work. In this group, however, was a large number of women whose general education was limited. Better work would be done by this type of nurse if a higher standard of education were

demanded before training, so that she could carry out health educational work both at the clinics and in the homes of the patients.

The Independent Midwives.

The independent midwives were, on the whole, not so satisfactory. Their standards, of course, varied. Some were very good, particularly those who were fully trained. There were many, however, who were not satisfactory. A large number were doing midwifery as part-time work. Some had homes or small shops to look after, and it was evident that midwifery was to them a secondary consideration. Frequently their hands were not clean or well kept. In many cases expectant mothers came to the home of the midwife for the purpose of booking, and a number of the homes seen were not an example of cleanliness to the patient.

The average time of booking was about the seventh month, and there were too many emergency cases. Some of the midwives did not insist upon being booked by their patients and their cases were so few that they were glad to take on any that came their way. Many of these midwives knew nothing about ante-natal care as it is understood to-day. Many midwives were unable to test urine; others who although they knew how to carry out the tests, frequently omitted to do them, or tested for albumin only. The majority of independent midwives used lysol as an antiseptic. Practically none wore masks or gloves. It was felt that many of the older women had no appreciation of the importance of asepsis and that their antiseptic methods were perfunctory. Some did not even wear a washing frock for the confinement but merely put on a clean apron.

In the poorer industrial areas it was not uncommon for the midwife to purchase cheap antiseptics, and for her equipment to be incomplete or in poor condition. In these areas bad debts were common and not infrequently the only payment received for a confinement was a bag of coal. Under these circumstances it was not surprising to find that the midwife had difficulty in providing herself with satisfactory equipment.

Twelve out of seventeen authorities furnished particulars of the ages of the independent midwives. Of 721 independent midwives 136 were over 60 years of age, seven were over 70 and two were over 80.

Owing to the absence of ante-natal clinics in the greater part of Wales the care of the pregnant woman falls chiefly on the midwives, and for this important responsibility many of the midwives are totally unfitted either by training or general education.

Fees ranged from 7s. 6d. to 30s. and occasionally up to £2, but many midwives had far too few cases to enable them to maintain a reasonable standard of living. The following Table shows the number of cases attended by the 1,261 midwives whose records were examined. These midwives include the majority of midwives practising in Wales.

Number of Midwives whose records were examined grouped according to number of cases undertaken, 1934.

Area of Supervising Authority.	Total Midwives	Number of Midwives with							
		less than 5 cases.	5-9 cases.	10-20 cases.	21-50 cases.	51-70 cases.	71-100 cases.	101-150 cases.	Over 150 cases.
Anglesey ...	38	9	7	7	14	1	—	—	—
Brecon ...	58	24	9	15	7	2	1	—	—
Caernarvon ...	70	10	7	21	28	2	2	—	—
Cardigan ...	34	2	10	14	6	2	—	—	—
Carmarthen ...	83	3	13	20	38	6	3	—	—
Denbigh ...	72	8	16	24	20	1	1	1	1
Flint ...	60	17	7	12	16	6	1	—	—
Glamorgan ...	279	34	42	52	102	28	12	8	1
Rhondda ...	59	8	2	12	19	9	9	—	—
Aberdare ...	20	4	2	2	8	3	1	—	—
Monmouth ...	120	1	14	22	48	15	14	6	—
Merioneth ...	25	3	6	6	10	—	—	—	—
Montgomery ...	45	8	5	19	13	—	—	—	—
Pembroke ...	73	5	12	33	22	—	—	1	—
Radnor ...	21	—	3	17	1	—	—	—	—
Cardiff ...	87	14	11	17	24	8	5	5	3
Merthyr Tydfil ...	32	4	1	10	9	6	—	1	1
Newport ...	35	9	5	3	7	1	6	3	1
Swansea ...	50	5	7	7	14	5	9	2	1
<i>Wales.</i> ...	1,261	168	179	313	406	95	64	27	9
No. of cases attended by midwives in above groups	35,988*	381	1,261	4,644	13,294	5,667	5,400	3,111	2,230

* Including 739 miscarriages.

It will be seen that 660, or slightly more than one-half of the midwives, had 20 or less cases, while 168 midwives had less than five cases in 1934. With so few cases it is difficult for the midwife to keep her equipment in good condition and maintain her skill.

While, however, roughly one-half of the midwives attended less than 20 cases in 1934, the Table also shows that most of the births were attended by the midwives who had larger practices. Thus, only 6,286 out of 35,988 births were attended by midwives who did 20 or less cases, and 29,702 births were attended by midwives who did more than 20 cases. As many as 16,408 births (nearly one-half) were attended by midwives who did more than 50 cases in 1934. Thus it can be said that the majority of the births were attended by midwives who had considerable practical experience in midwifery.

Cases attended by Midwives, 1934.

The number of cases attended by the various types of nurse in the sample of 1,261 midwives were:—

Type of Nurse.	No. of Nurses.	Cases attended.		
		Maternity.*	Midwifery.*	Total.
Queens	61	592	1,437	2,029
District	336	2,002	4,475	6,477
Independent	804	3,481	21,439	24,920
Institution... ...	60	1,496	1,066	2,562
Totals	1,261	7,571	28,417	35,988*

* For description of "maternity case" and "midwifery case" see page 103.

The numbers of maternal, foetal and neo-natal deaths which occurred among the 1,261 midwives in 1934, grouped according to class of nurse, are shown in the Table below. The cases of the Queens and District nurses have been combined for maternal deaths, because these nurses work under similar conditions and also because the number of deaths in each group is small. It will be noticed that the rates are higher for cases attended by midwives in institutions than for other cases, but it should be remembered that the hospital deals principally with abnormal cases and many of the women are seriously ill before admission.

Type of Nurse.	Births.	Maternal Deaths.		Foetal Deaths.		Neo-natal Deaths.	
		Number.	No. per 1,000 births.	Number.	No. per 1,000 births.	Number.	No. per 1,000 births.
Queens	2,008	14	1.68	76	37.8	132	65.7
District	6,342	52	2.13	285	44.9	417	65.7
Independent	24,405			1,197	49.0	1,722	70.5
Institution	2,494			173	69.4	263	105.4
Totals	35,249	93	2.64	1,731	49.1	2,534	71.9

Bona fide Midwives.

There were 24 *bona fide* midwives; most of them were old women who knew nothing about ante-natal examination and certainly did not encourage their patients to take advantage of the facilities available. Some of the *bona fide* midwives were scrupulously clean and had a large experience of midwifery; others, however, were not nearly so satisfactory. During 1934 there was only one maternal death in the practice of the *bona fide* midwives.

A summary of the work of 20 of the *bona fide* midwives in 1934 is given below; collectively they were responsible for 470 cases.

<i>Area of Supervising Authority.</i>	<i>No. of Midwives.</i>	<i>No. of Cases.</i>
Anglesey	...	...
Carmarthenshire*	1	5
Flintshire	...	4
Rhondda Urban District*	...	143
Montgomeryshire	...	1
Pembrokeshire	...	5
Newport County Borough*	...	88
Swansea County Borough	...	2
		12
		2
		16
		4
		202
		1
		3
		—
Wales	...	20
		—
		470
		—

* Two *bona fide* midwives in Carmarthenshire attended 70 and 67 cases respectively, and three midwives in Newport attended 76, 61 and 50 cases respectively. One midwife in the Rhondda attended 42 cases.

Payments by Local Authorities.

In 744 cases the Authority paid, or contributed to, the fee of the midwife. All these cases were in Glamorgan, Denbighshire, Newport and Swansea. The Glamorgan County Council also paid a subsidy to four midwives, but this Council is the only Authority which has undertaken to make such payments.

Areas not covered by the Midwifery Service.

Two parts of Wales only were not covered by a midwifery service. These were in Cardiganshire, where about five midwives were needed, and in a small part of Breconshire, where one midwife was needed. In the latter area, however, the number of births is very small. In Cardiganshire an added difficulty in the unprovided area was the remoteness of several of the districts from the telephone service. These areas must have been served by handy-women, but it was difficult to obtain evidence on this matter. Medical Officers and Supervisors of Midwives stated that there were no handy-women in their areas and many of the general practitioners endorsed this opinion. In order to obtain some idea of the number of cases not attended by a midwife the notified births in each area were compared with the total cases attended by midwives in the area for each of the past ten years. The number of cases not attended by midwives was found to decrease each year and in 1934 was quite small.

Post-certificate Courses for Midwives.

Efforts were being made in many areas to stimulate the interest of the midwives in modern practice and to bring their methods up to date by facilities for post-certificate training.

In some areas arrangements were made for two or three midwives to attend a two weeks' post-certificate course at Plaistow each year, and in one case the midwives were sent for a month. In North Wales it was usual for two or three midwives to attend a post-certificate course at Liverpool lasting one week. While it is encouraging to find that the need for this kind of refresher course is being appreciated, the courses are usually too short to be of much value to the midwife. Under the present arrangements, also, with so few nurses attending each year, some nurses will have to wait several years before they can attend a post-certificate course. In some of the larger clinics the midwives who accompanied their patients to the clinics were given every opportunity of gaining experience in ante-natal examination.

Supervision of Midwives.

Supervision of midwives is carried out by a whole-time trained nurse supervisor in most areas. The supervision was good and much help and advice was given to the midwives. Supervision was not always so satisfactory when carried out by a Medical Officer, as sufficient time could not be given to the work, and inspections, therefore, could not be done frequently or thoroughly.

Institutional Provision.

Separate accommodation apart from the Poor Law is provided for maternity cases by only five Maternity and Child Welfare Authorities, and four other Authorities pay a subsidy to voluntary institutions for the use of maternity beds. Particulars of the beds utilised by these nine Authorities are given below.

Administrative Area.	Maternity Homes provided by the Local Authority.			Voluntary Institutions subsidised by the Council.		
	No. of homes.	No. of beds.	No. of women admitted in 1934.	No. of hospitals.	No. of beds.	No. of women admitted in 1934
<i>Counties.</i>						
Caernarvon ...	—	—	—	2	6	83
Cardigan ...	1	13	61	—	—	—
Flint ...	1	10	232	—	—	—
Glamorgan ...	2*	20	359	—	—	—
Monmouth ...	—	—	—	1	7	100
Montgomery ...	—	—	—	3	13	97
<i>County Boroughs.</i>						
Cardiff ...	—	—	—	1	27	788
Swansea ...	2	18	528	—	—	—
Wales ...	6	61	1,180	7	53	1,068

* Provided by two Urban District Councils (Maesteg and Mountain Ash).

Note.—No accommodation for maternity cases apart from that provided in poor law institutions exists in the following counties:—Anglesey, Brecon, Carmarthen, Denbigh, Merioneth, Pembroke and Radnor. The county boroughs of Merthyr Tydfil and Newport also have no beds set aside for maternity cases except in poor law institutions.

In addition accommodation is provided for maternity cases at 42 poor law institutions in Wales, containing 185 beds, and 1,400 women were admitted during 1934. With the exception of the large institutions in the industrial counties and the county boroughs the accommodation available in the poor law institutions was not generally suitable for maternity cases. The beds were used mainly by the destitute and by unmarried mothers. The institutions were without a resident Medical Officer and in only a few was there an operating theatre or any facilities for dealing with abnormal or emergency cases. In many areas in Wales, however, no better type of accommodation was provided.

In some areas difficult maternity cases were admitted to voluntary hospitals and paid for by the Council. During 1934, 61 women were admitted to maternity beds in these hospitals. In other areas general practitioners who are on the staff of a local hospital arranged for difficult cases to be admitted to the hospital.

The survey shows that the number of beds provided by, or subsidised by, Local Authorities in Wales for maternity cases is quite inadequate. Many of the cases admitted to hospital, moreover, are not under the supervision of a consultant obstetrician, and the institutions are not provided with facilities considered essential in maternity hospitals. Many emergency cases are admitted to these hospitals and the importance of every available aid to treatment being at hand is obvious.

All these institutions admit cases for treatment during the ante-natal period, but except in Swansea beds are not reserved specially for such cases.

There are 55 private nursing homes in Wales which have some accommodation for maternity cases. The number of beds, however, is small and the cases admitted each year are few. Two homes provide maternity accommodation for unmarried mothers. The Northlands Home, maintained by the Salvation Army in Cardiff, receives a grant from the Cardiff City Council, and has 23 beds available. In 1934, 40 cases were admitted. The women are mainly from Cardiff and district, but occasionally when there are vacancies, women from other parts of Wales are received. The Monmouthshire County Council pay a grant to Nantyderry, a home for unmarried mothers near Abergavenny. This home has ten beds, and 14 cases were admitted in 1934.

Post-Natal Services.

With the exception of the County Borough of Cardiff, no Authority had provided a separate post-natal clinic. At Swansea post-natal work was done at the ante-natal clinics and many

mothers attended who had passed through the ante-natal clinics and the maternity homes. Similarly, in Flintshire routine post-natal work was carried out at the ante-natal clinics. Elsewhere there was little evidence of any effective post-natal work. One of the main difficulties in the way of establishing such clinics in Wales is that except in the large towns no consultant gynaecologist is available to whom cases may be referred when abnormalities have been detected.

Arrangements for Home Nursing and Treatment of Puerperal Sepsis.

Twelve of the 17 county and county borough Authorities had made some arrangement for home nursing of cases of puerperal fever, but only five Authorities, namely, Cardiff, Newport, Caernarvonshire, Cardiganshire and Denbighshire, had provided such a service during 1934. The other Authorities had made varying arrangements for the nursing of such cases. In some areas a private nurse was engaged at the discretion of the Medical Officer of Health, in others a Health Visitor was sent to do the work, and one area had an arrangement with a panel of nurses who could be called upon when necessary. In many areas the midwife in attendance was allowed to carry on with the case and arrangements were made for the nursing of the other cases she had booked.

During 1934, 536 cases of puerperal fever and puerperal pyrexia were notified. 209 women were removed to hospital and in 22 cases home nursing was provided by the Authorities. The following Table shows the activities of the various Authorities:—

Authority.	Cases notified during the year.	Cases visited by Officers of the Council.	Cases for whom home nursing was provided by the Council.	Cases removed to Hospital.	Deaths from Puerperal Sepsis.
<i>Counties.</i>					
Anglesey—					
P.F. ...	1	1	—	—	2
P.P. ...	4	1	—	1	—
Brecon—					
P.F. ...	6	3	—	3	—
P.P. ...	4	1	—	3	—
Caernarvon—					
P.F. ...	5	1	2	3	3
P.P. ...	6	3	1	5	—
Cardigan—					
P.F. ...	2	2	2	2	—
P.P. ...	6	6	6	—	—

Authority.	Cases notified during the year.	Cases visited by Officers of the Council.	Cases for whom home nursing was provided by the Council.	Cases removed to Hospital.	Deaths from Puerperal Sepsis.
<i>Counties—cont.</i>					
Carmarthen—					
P.F.	9	9	—	3	7
P.P.	13	13	—	4	—
Denbigh—					
P.F.	15	13	1	6	6
P.P.	13	13	—	—	—
Flint—					
P.F.	7	7	—	4	—
P.P.	30	30	—	7	—
Glamorgan—					
P.F.	52	11	—	32	40
P.P.	102	46	—	26	—
Merioneth—					
P.F.	1	1	—	—	1
P.P.	1	1	—	1	—
Monmouth—					
P.F.	5	5	—	4	15
P.P.	23	23	—	5	—
Montgomery—					
P.F.	3	2	—	2	3
P.P.	7	5	—	3	—
Pembroke—					
P.F.	2	2	—	—	—
P.P.	5	5	—	—	—
Radnor—					
P.F.	1	1	—	1	1
P.P.	1	1	—	1	—
<i>County Boroughs.</i>					
Cardiff—					
P.F.	58	16	4	12	12
P.P.	51	—	3	5	—
Merthyr Tydfil—					
P.F.	2	2	—	—	1
P.P.	4	4	—	—	—
Newport—					
P.F.	15	6	—	14	3
P.P.	9	9	3	6	—
Swansea—					
P.F.	41	41	—	38	10
P.P.	32	32	—	18	—
WALES—					
P.F.	225	123	9	124	104
P.P.	311	193	13	85	—

In most areas the treatment of puerperal fever by the Local Authority is provided at the local isolation hospital, and the

accommodation is often unsuitable. Few of the hospitals have an operating theatre and no facilities exist for the special and expert treatment required in puerperal fever.

Consultant Services.

Arrangements exist in all areas except Pembrokeshire whereby a practitioner may obtain help in cases of difficult labour and in puerperal fever.

Cardiff and Swansea are centres of consultant practice, and in industrial South Wales the services of a consultant are frequently obtained through the arrangements made by the Authorities. The counties of Radnor and Brecon also rely on Cardiff and Swansea for their consultants, but their services are rarely requisitioned.

Merionethshire and Flintshire have arrangements with a consulting surgeon at Chester, while Cardiganshire utilise the services of general practitioners experienced in obstetrics. In Caernarvonshire practitioners are able to call in a colleague.

During 1934 Flintshire called in their consultant from Chester on 31 occasions, at a cost of £141, and Cardiganshire availed themselves of consultant services on about 16 occasions at a cost of £33. Outside Flintshire, Cardiganshire and industrial South Wales no expenditure was incurred on a consultant service during 1934.

Denbighshire rely upon a whole-time officer for consultation work. He is an experienced obstetrician, and has charge of the ante-natal clinics and the county maternity beds. His services are frequently sought by practitioners in difficult cases.

Ancillary Services.

Provision of Milk and Extra Nourishment.

All Authorities supplied milk to necessitous expectant and nursing mothers free or at less than cost price. Nine Authorities supplied in addition vitamin concentrates such as cod liver oil, bemax and marmite. Thirteen Authorities also supplied milk or milk foods at cost price to non-necessitous expectant and nursing mothers. No Authority provided free meals.

Home Helps.

On the question of providing home helps there was much difference of opinion among those interviewed. Most Medical Officers of Health declared that a scheme for the provision of home helps would not work. In a few areas where arrangements had been made there had been no applications for the services of the home help. On the other hand many general practitioners

in the rural districts considered that some arrangement for the supply of home helps would be of real benefit in their districts.

A scheme in operation in the County Borough of Cardiff has worked successfully and during 1934 help was arranged for expectant mothers attending the clinics in 168 cases. Five other Authorities had made arrangements for providing home helps, but only in the Pontardawe Rural District had any applications been received for this service. In Breconshire the District Nursing Association maintained one home help in the Abercraf district, and in Radnorshire a voluntary association occasionally provided help.

If the availability of their services and their utility were made better known to doctors, midwives and expectant mothers it is likely that more use would be made of this service.

Laboratory Facilities.

With the exception of Breconshire and three of the small Authorities in Glamorgan, all Authorities had made some arrangement for the laboratory examination of pathological material in connection with maternity cases. Generally it was found that the service available was seldom utilised.

Dental Provision.

Dental treatment for expectant mothers had been provided by the Authorities in all except six counties, and most Authorities had extended the service to cover nursing mothers.

In the large towns the service was appreciated and an increasing number of mothers were taking advantage of it. In the rural counties, however, very little work was being done. There was some evidence that this service, like so many other of the public health services, was not known to the majority of women and that more mothers would avail themselves of dental treatment if they were aware of the facilities provided.

Provision of Maternity Outfits.

Few Authorities provided sterile maternity outfits. Several Authorities have attempted to introduce them, but there were no requests for the outfits and they remained unused. One Authority gave up the service because on bacteriological examination the contents of the packages were found not to be sterile. Only in the County Borough of Cardiff, in Flintshire and in Radnorshire did the service appear to be appreciated by the midwives.

Educational Propaganda and Publicity.

There was little evidence of any educational propaganda or publicity by the Local Authority in regard to the care of the

expectant mother. In one or two of the large towns clinics were advertised by means of posters placed outside the clinic buildings, but no other means of publicity were usually adopted. Generally it was found that the clinic premises were not prominently brought to notice, and probably many women experienced difficulty in finding the clinic.

In some areas general health talks were given occasionally by the Medical Officer of Health or his assistant to certain women's societies, and in some of the county districts the Women's Institutes were endeavouring to interest women in domestic work by including such subjects as cookery and various homecrafts in their lectures. Such efforts are probably helpful to those women who already take an interest in their health and homes, but it is doubtful whether they reach the poorer sections of the community.

Transport Facilities.

As an integral part of the hospital service proper facilities should be provided for the transport of patients. For most areas in Wales the transport services are not good. In two counties only have the county council themselves provided an ambulance for general and maternity cases. In one county the only means of removing patients to hospital were by police vans, farm vehicles and private transport. In the Dolgellau and Barmouth districts in Merionethshire and in West Carmarthenshire no provision at all existed, but elsewhere in Wales a service was available, provided either by the Priory of St. John, local hospitals, or other voluntary effort.

Most of the inhabited areas are reasonably accessible by good roads. In spite of the absence of proper provision by Local Authorities in the matter of transport, general practitioners asserted that inaccessibility and lack of transport were rarely the cause of delay in the removal of a patient to hospital, and inquiries into maternal deaths led to the same opinion. Cases of puerperal fever were removed to hospital in ambulances attached to the hospitals for infectious diseases.

III.

MATERNAL DEATHS.

Classification of Maternal Deaths.*Puerperal and "Associated" Deaths.*

Deaths placed in the puerperal class are deaths certified by doctors or coroners assignable to Group Nos. 140-150 of the Manual of the International List of Causes of Death, as adopted for use in England and Wales. The present classification has been used since 1931, and is based upon the fourth decennial revision by the International Commission, Paris, 1929.

In addition to the deaths returned as due to diseases of pregnancy, childbirth and the puerperal state (referred to as *puerperal deaths*) the Registrar-General publishes each year for England and Wales statistics of "deaths of women not classed to pregnancy and childbearing but returned as associated therewith". These deaths, when added to the puerperal deaths, give the "maternal mortality". The terms *puerperal mortality* and *maternal mortality* are used throughout this report in these restricted senses, while the deaths associated with pregnancy and childbearing are referred to as *associated deaths*.

Where insufficient information is given on the death certificate the cause of death is referred by the Registrar-General to the certifying practitioner for further information, both as regards puerperal deaths and deaths from other diseases where a possibility of a puerperal origin is suggested.

The statistics of puerperal mortality for Wales for 1924-33 have already been discussed in the section of this report entitled "Preliminary Statistical Observations". It is there shown that the mortality rates are high for all the counties and county boroughs of Wales. The statistics relate only to puerperal mortality (Group Nos. 140-150), and not to maternal mortality, i.e. deaths from puerperal and "associated" causes. Particulars of the puerperal deaths for Wales for 1924-33 were supplied by the Registrar-General, and are tabulated in Appendices VI, VII and IX.

Deaths investigated by Medical Officers of Health.

Since 1928 Medical Officers of Health, at the suggestion of the Minister, have been making confidential investigations into maternal deaths in their areas. The investigations have been more complete in some areas than in others, but it was possible to examine particulars of 1,079 maternal deaths which occurred in Wales during 1929-34. These "investigated" deaths embraced deaths from puerperal causes (Group Nos. 140-150)

and from "associated" causes, whereas, as mentioned above, the statistics of the Registrar-General relate only to puerperal mortality.

The detailed information available concerning these 1,079 "investigated" maternal deaths has been of the greatest assistance in examining the various problems connected with the subject of the inquiry. In many cases it was possible to supplement or confirm this information from other records in existence. The deaths to some extent, of course, form a selected group, since all deaths in Wales during the period covered are not included, and generally speaking the investigations of the Medical Officers of Health were made with greater thoroughness in the urban than the rural areas; but the large sample of 1,079 deaths can be regarded as fairly representative of all maternal deaths which occurred in Wales during 1929-34. In the discussion in the following pages most of the statistical data are based upon the "investigated" deaths, although in some cases the statistics of the Registrar-General have been used.

Abridged Classification.

In the classification of deaths according to separate cause it was considered more convenient to adopt a simpler grouping than that provided by the International List classification (i.e. Group Nos. 140-150 for puerperal deaths, with the deaths from "associated" causes forming a separate class). The classification used comprises six groups, and is similar to the classification suggested by the Scottish Departmental Committee on Puerperal Morbidity and Mortality in their report issued in 1924, with the addition of "abortion" as a separate class. The groupings are:—

- (a) Intercurrent diseases complicating gestation, e.g. infectious diseases, diseases of the heart, lungs, etc.
- (b) Toxaemias of gestation, e.g. pernicious vomiting, albuminuria, eclampsia, etc.
- (c) Haemorrhages of gestation, e.g. ectopic gestation, placenta praevia, accidental haemorrhage, post partum haemorrhage, etc.
- (d) Trauma, apart from haemorrhage and sepsis, e.g. rupture of uterus, etc., shock, exhaustion.
- (e) Sepsis in all its forms.
- (f) Abortion.

Advantages of this simpler classification are:—

- (1) with the smaller number of sub-divisions there is less difficulty, in cases of two or more joint causes of death, in assigning the death to one particular cause;

(2) comparison can better be made between the various causes of death and etiological factors;

(3) there is a close correspondence between the subdivisions into the six groups as defined above and the International List classification (Group Nos. 140-150, with the additional class "associated" causes). Thus, as regards puerperal deaths, abortion in the former classification comprises deaths classed to Group Nos. 140 and 141, sepsis corresponds to No. 145, toxæmias to Nos. 146 and 147, and haemorrhages to Nos. 142, 144a and 144b. The majority of cases in Group Nos. 143, 148, 149 and 150 correspond to the classification of trauma, but some of these deaths may properly be classed to another group cause;

(4) a simple classification of the deaths into fairly well defined pathological groups is possible.

Certification of Maternal Deaths.

The statistics of puerperal mortality published by the Registrar-General show that the death-rate has been increasing in recent years; and it is a matter of public concern that this increase has occurred notwithstanding the greater provision for maternal care now made by the Local Authorities.

The source from which information concerning maternal deaths is obtained is death registration. Certificates of death are given in most cases by medical practitioners, but in some cases they are given by coroners. The statistics based upon the information in these certificates will not measure the true mortality in an area unless all deaths which occur among women in childbirth are correctly certified. If the standard of certification is better in some areas than in others or has improved as a result of the closer attention which is now being given to this subject, it is obvious that no completely reliable basis exists in instituting statistical comparisons, either for different areas or for different periods of years. Some at least of the recorded increase in puerperal mortality in recent years could be due to greater accuracy in certification.

There was good reason for believing that inaccuracy in certification in Wales was not uncommon, although it is the general opinion that there has been greater accuracy in recent years.

Inaccuracy of Certification among Investigated Deaths.

The information available from the investigations made by Medical Officers of Health into maternal deaths during 1929-34 provided a means of examining the degree of accuracy in certification shown as regards these deaths. In some cases additional information was available, and from all the particulars collected it was possible to determine whether a correct

assignment of the cause of death had originally been made in the returns of the Registrar-General. The cause of death was reviewed in all the 1,079 investigated deaths, and the classification amended where the cause as certified appeared to be incorrect. In cases of doubt the original certified cause of death was allowed to stand.

In Appendix XVI the result of the revised classification of the investigated deaths is shown in detail. The totals of the horizontal entries show the number of deaths from the separate causes as certified to the Registrar-General, and the totals of the vertical columns show the number of deaths as classified in the simpler six-group classification already mentioned (page 45).

Summary figures are given below, and the comments in the following paragraphs will explain the method of tabulation employed:—

Cause as certified to the Registrar-General.	Classification on fuller information following scrutiny of records.		
	Puerperal.	Associated.	Total.
Puerperal	821	32	853
Non-puerperal but "Associated"	101	95	196
Non-puerperal (no mention of pregnancy on the certificate) ...	19	11	30
Total	941	138	1,079

Of the 1,079 deaths, 853 were *certified* as directly due to pregnancy and childbearing, and were classed as puerperal (one of Group Nos. 140-150 in the International List). In 196 cases the *certified* cause was non-puerperal (e.g. influenza, heart disease, tuberculosis, nephritis, or other intercurrent disease), but pregnancy and childbearing was an associated cause of death. Thus the number of maternal deaths as *certified* and as so classed in the returns of the Registrar-General was 1,049 (853 puerperal and 196 associated), and the remaining 30 deaths investigated were not certified as being in any way connected with pregnancy or childbearing.

The examination of the records suggested that 922 of these 1,049 maternal deaths should have been classed as puerperal and 127 as "associated"; and, further, that of the 30 deaths in which no mention of pregnancy was made on the certificate 19 were puerperal and 11 were "associated". Thus it appears that 941 and not 853 of the 1,079 deaths should have been certified as puerperal and 138 deaths should have been certified as from causes associated with pregnancy and childbearing.

In other words, on the sample of 853 *certified* puerperal deaths investigated, covering the period roughly 1929-34 (during which period 1,514 puerperal deaths occurred in Wales), it was considered that there was understatement of puerperal mortality as certified to the Registrar-General by 10.3 per cent. Furthermore, there were some deaths from associated causes which were not included as such in the Registrar-General's returns.

The detailed analysis according to the separate causes of death (see Appendix XVI) shows that as regards puerperal mortality there was understatement for abortion, haemorrhage and sepsis, while for the toxæmia group the true mortality was overstated.

It will be observed that of the 1,049 *certified* maternal deaths mentioned above, 196 were deaths from "associated" causes. This number represents 18.7 per cent. of the maternal deaths—a smaller percentage than that for all maternal deaths which occurred in England and Wales during 1929-34, namely, 23.3 per cent. It is natural to suppose that in the investigations into the causes of maternal death undertaken by the Medical Officers of Health fuller information was available of the circumstances of puerperal deaths than of "associated" deaths. Unless there was fairly definite evidence of pregnancy or childbirth associated with the case the Medical Officer of Health would be unlikely to make the death the subject of investigation. Had all the "associated" deaths which occurred in Wales been investigated the Welsh percentage of 18.7 mentioned above would probably have approximated nearer to the England and Wales percentage of 23.3.

Since, also, it was found that in the sample of 196 deaths *certified* as due to "associated" causes no less than 101 were more properly assignable to the puerperal class, it may be concluded that, if *all* the "associated" deaths which occurred during 1929-34 had been taken a still larger number could probably have been assigned to a puerperal heading. It is shown above that 941 and not 853 of the investigated deaths should have been certified as puerperal (i.e. true mortality was understated by 10.3 per cent.). Had the sample of deaths been more complete the percentage of understatement of true mortality might have been even greater than 10.3 per cent.

It was observed in the course of examining the records of hospital and domiciliary cases that for deaths certified in hospitals (where diagnostic facilities are better) the proportion of "associated" to total maternal deaths was definitely less than for deaths certified among the domiciliary cases. This appears to be further evidence in support of the view that a number of puerperal deaths occur which are not certified as such and consequently fail to be included as puerperal deaths in the official statistics.

Reasons for Improvement in Certification.

More accurate certification has been possible in recent years because:—

- (1) The revised form of death certificate enables the train of causes leading to death to be set out more clearly.
- (2) More cases are being admitted to hospital, where opportunities for diagnosis are better.
- (3) Improved facilities for assisting diagnosis, such as a consultative service and pathological examination, are at the disposal of the general practitioner.
- (4) Increased attention is being paid to the subject of maternal deaths by the health authorities and by the general public.

Effect of varying Standards of Certification on Mortality Rates.

No means of testing the accuracy of certification for periods earlier than 1929 were available. It is clear, however, that one important factor contributing to the increase in recorded puerperal mortality in Wales since the War has been a gradual improvement in the standard of certification. The extent to which the increase in mortality has been real or has been due to better certification cannot be stated. It does, however, appear to be a fair statement that the actual increase in mortality has not been so great as the statistics suggest. Further comment on this subject is made on pages 18 to 20.

The observations made have shown that a number of puerperal deaths still occur which are not certified as puerperal. Gradually, it may be hoped, this number will become less and less. One result must be that in an area where the true puerperal mortality remains stationary the statistics of mortality will indicate an increase. It is important that full regard should be had to such considerations in studying the statistics of puerperal mortality for different areas over different periods of time. Loose statements based on insufficient appreciation of the significance of statistical data are to be deprecated.

Clinical Information concerning Maternal Deaths.

As already mentioned, considerable use was made of the information in the confidential case papers of the Medical Officers of Health relating to maternal deaths investigated during 1929-34. The data concerning the deaths in the earlier years were available to the Departmental Committee on Maternal Mortality and Morbidity, which issued an Interim Report in 1930 and a Final Report in 1932,* and from 1932 onwards

* Published by H.M. Stationery Office.

summary information of the investigated deaths in England and Wales has been published in the Annual Reports of the Chief Medical Officer of the Ministry of Health. The case papers relating to each of 1,079 maternal deaths in Wales have been examined, and the clinical information contained in them has been carefully considered before the data have been accepted.

Many of the cases present interesting clinical pictures, including some in which the departures from what might be considered normal circumstances were so great that there was presumptive evidence that the death might not have occurred if these abnormal circumstances had not been present. It is, however, impossible to generalise as to the causes of maternal mortality from the examination of individual cases, but as corroborative evidence the information contained in the case papers has proved useful. Analyses of the cases classified according to their main features are used throughout this report.

It should be noted that before drawing conclusions account has been taken of the extent to which certain factors present among the deaths were also present where the patient survived pregnancy. Information is given concerning 35,988 births which occurred during 1934, and these births have been taken as a control sample. Wherever possible the various analyses made of the maternal deaths have been compared with similar analyses of the births.

SOME FACTORS WHICH INFLUENCE RISK TO THE MOTHER AND CHILD.

Mortality according to Age and Order of Pregnancy.

Statistics are given in this section showing the relative risk of death from childbearing according to the age of the mother and the order of birth. It is necessary to give some preliminary words of explanation concerning the statistics.

Statistical Method adopted.

The number of puerperal deaths in age periods for 1929-33, totalling 1,235, was supplied by the Registrar-General. A grouping of these deaths according to parity position of the child was not possible, however, since information under this head is not obtainable from official records. The only information available under this heading was from the records of 853 puerperal deaths investigated by Medical Officers of Health during 1929-34, of which both the age and the parity distribution were known. Calculations have accordingly been based upon the known data relating to 1,235 deaths as regards age distribution and the 853 deaths as regards parity position of the child. In the case of the 853 deaths the statistics have also been analysed according to parity in separate age groups.

As regards the classification of births, a difficulty arose in relating the numbers of deaths to the numbers of births. Birth registration does not furnish information as to the age of the mother or the parity position of the child. It was necessary, therefore, to work on an indirect method.

Detailed particulars had been collected of 35,988 cases (including 739 miscarriages and 414 twin births) attended by midwives during 1934 (compared with 42,203 total births registered for Wales during 1934). The parity position of the child was known in all 35,988 cases, and the age of the mother in 35,367 cases. The proportionate distribution of these births according respectively to the age of the mother and the parity position of the child was related to the proportionate distribution of the deaths according to age and parity and in this way an index figure was calculated for each age and parity group. It will be seen from the Tables below, which illustrate the method adopted, that 100 is taken as the index of risk for all groups and that the index figures for the various groups range above or below 100 according as the risk is greater or less than the average for all pregnancies.

The method is open to the criticism that births for one year (1934) are related to deaths for a period of years (1929-33 for age and 1929-34 for parity). The calculations have been made on the assumption that the age and parity distribution of the births during 1929-33 and 1929-34 respectively were in the same proportion as for 1934. Actually owing to the fall in the

birth-rate for Wales (from 16.7 to 15.6 per 1,000 of the population between 1929 and 1934) the proportion of first pregnancies would probably have been slightly less, and the proportion of later pregnancies rather more, for 1929-34 than for 1934. The index figures for parity given below may therefore slightly underestimate the extra risk of first labour and slightly overstate that for higher birth numbers.

Births and Puerperal Deaths in Wales according to Age of Mother.

Age Group.	Births (Midwives' Registers, 1934.)			Number of Puerperal Deaths, 1929-33.		
	Wales I.	Wales II.	Wales.	Wales I.	Wales II.	Wales.
	15-	25-	30-	35-	40-	45-
15-	8,293	2,191	10,484	190	43	233
25-	7,935	2,462	10,397	228	81	309
30-	5,494	1,996	7,490	204	83	287
35-	3,369	1,278	4,647	204	73	277
40-	1,550	515	2,065	83	30	113
45-	215	69	284	13	3	16
Totals	26,856	8,511	35,367*	922	313	1,235

* Excluding 621 births where age of mother was not stated.

Age Group.	Proportionate No. of Births in each Age Group			Proportionate No. of Deaths in each Age Group.			Index of Risk, i.e. $\frac{\text{proportionate deaths}}{\text{proportionate births}} \times 100^*$		
	Wales I.	Wales II.	Wales.	Wales I.	Wales II.	Wales.	Wales I.	Wales II.	Wales.
	15-	25-	30-	35-	40-	45-	All ages	All ages	All ages
15-	30.88	25.74	29.64	20.61	13.74	18.87	67	53	64
25-	29.55	28.93	29.40	24.72	25.88	25.02	84	89	85
30-	20.46	23.45	21.18	22.13	26.52	23.24	108	113	110
35-	12.54	15.02	13.14	22.13	23.32	22.43	176	155	171
40-	5.77	6.05	5.84	9.00	9.58	9.15	156	158	157
45-	0.80	0.81	0.80	1.41	0.96	1.29	176	118†	161
All ages	100.00	100.00	100.00	100.00	100.00	100.00	100*	100*	100

* The actual death-rate, all ages, 1929-33, was 5.79 per 1,000 births for Wales I and 6.01 for Wales II. It will be appreciated that the index figures in these three columns should be read vertically only, in terms of 100 for all ages, and not horizontally.

† Based on only 3 deaths (see Table above).

Births and Puerperal Deaths in Wales according to Number of Pregnancies.

Note.—No separate statistics for regions Wales I and Wales II are given in this Table, as the numbers of deaths in region Wales II among mothers who had had four or more previous pregnancies was considered too small for statistical treatment.

No. of Pregnancy.	No. of Births (Midwives' Registers, 1934.).	No. of (investigated) Deaths, 1929-34.	Proportionate No. of Births and Deaths in each Parity Group.		Index of Risk, i.e. $\frac{\text{proportionate deaths}}{\text{proportionate births}} \times 100$
			Births.	Deaths.	
1	12,629	356	35.10	41.73	119
2	8,353	153	23.20	17.94	77
3	5,025	102	13.96	11.96	86
4	3,202	69	8.90	8.09	91
5	2,124	57	5.90	6.68	113
6 & 7 ...	2,536	59	7.05	6.92	98
8 & above ...	2,119	57	5.89	6.68	113
Totals ...	35,988	853	100.00	100.00	100

Proportionate Distribution of Births and Deaths.

First, some observations of general interest may be made on the statistics of the births attended by midwives in 1934. It will be observed that 12,629, or 35 per cent., were primiparous. In only 28 per cent. of the cases had there been three or more previous pregnancies. When it is borne in mind that the birth-rate for Wales has fallen from 30.1 per 1,000 of the population in 1901-10 to 15.6 per 1,000 in 1934, it will be realised that the proportion of first births must now be considerably larger than in former times. The percentage of cases of three or more previous pregnancies during 1901-10 was probably much higher, also, than the 28 per cent. shown for 1934.

Fifty-nine per cent. of the total births occurred among women under 30, and only 20 per cent. among women over 35; but as regards deaths 44 per cent. of the deaths occurred among women under 30, and 33 per cent. among women over 35.

It is of interest to examine the birth statistics in relation to parity and age, and particulars of 35,367 of the births are tabulated below.

*Births according to Age and Number of Pregnancies.
(Cases attended by Midwives, 1934).*

Number of Pregnancy.	15-	25-	30-	35-	40-	All ages.
1	6,850	3,643	1,386	461	137	12,477
2	2,621	3,151	1,656	631	128	8,187
3	765	1,884	1,414	630	206	4,899
4	192	979	1,117	632	219	3,139
5 and above ...	56	740	1,917	2,293	1,659	6,665
All Pregnancies ...	10,484	10,397	7,490	4,647	2,349	35,367

In rather more than one-half of the first births the mother was under 25 (i.e. the age of lowest maternal risk). In only 4.8 per cent. of primiparous births was the mother over age 35. Second and third births are shown to be most common between ages 25-30, and fourth births between ages 30-35. Most pregnancies after the fourth occur after age 35.

Risk according to Age.

The risk of death is lowest for ages under 25, and next lowest for ages 25-30. For both periods the risk is well below the average for all ages, and as already pointed out 59 per cent. of the total births occurred among women under age 30. The majority of the primiparous births occur during these ages, and the maternal risk for first births is relatively high. If the additional risk associated with primiparity could be removed,

the relatively low mortality rate for mothers under age 30 would be even more favourable than the index figures in the Table show.

The risk of death between ages 30 and 35 is about 10 per cent. above the average risk for all ages. Thereafter a decided increase is shown, and the risk after age 35 can be placed at roughly $2\frac{1}{2}$ to 3 times the risk for ages under 25. The risk after age 25 appears to increase relatively less in rural than industrial districts, although it would be unwise to regard the index figures as illustrating more than tendencies.

Women in rural Wales marry at later ages than women in the industrial districts (see page 10), and one result is that a larger proportion of the births in rural Wales occur in the later years of childbearing age. The percentage of births occurring in each age group in Wales I and Wales II in 1934 is shown in the Table on page 52. Both for 1924-8 and 1929-33 the puerperal mortality rate per 1,000 live births was higher in Wales II than Wales I, the rates being:—

	<i>Wales I.*</i>	<i>Wales II.*</i>	<i>Percentage excess of rate for Wales II.</i>
<i>Per cent.</i>			
1924-8	... ... 5.24	5.68	7.75
1929-33	... ... 5.79	6.01	3.66

* For statistics in greater detail, see page 24.

Since maternal risk increases with age it may be supposed that a lower puerperal mortality rate would have occurred in Wales II if the age distribution of the women at childbirth had been the same as in Wales I. An attempt has been made to assess the influence of this factor of age on the puerperal mortality rate for Wales II by estimating the number of puerperal deaths that would have occurred in 1929-33 had the proportionate distribution of the births been the same for this region as for Wales I, the mortality rates for the several age periods remaining unchanged. Actually there were 313 puerperal deaths in Wales II during 1929-33, but applying the method of standardisation indicated, this number becomes 300. That is to say, if the proportion of mothers in each age group had been the same in the two regions, other things being equal the puerperal mortality rate for Wales II during 1929-33 would have been 5.76 per 1,000 births, a rate very similar to that for Wales I (5.79) in the same period.

The number of puerperal deaths among married and single women in the several counties and county boroughs of Wales during 1924-33 according to age is given in Appendix VII.

Risk according to Age for separate Causes of Death.

In the following Table an assessment is made of relative risk according to age for separate causes of death.

Relative Risk of Death from Puerperal Causes according to the Age of Mother, 1929-33.

(Proportionate number of deaths expressed as a ratio of the proportionate number of births for each age period.)

Age Period.	Abortion (140 & 141).	Sepsis (145).	Haemorrhages (142 & 144).	Toxaemias (146 & 147).	Other Causes (143 & 148-150).	All Causes (140-150).
15- ...	47	77	31	82	55	64
25- ...	74	94	66	75	104	85
30- ...	111	107	123	108	107	110
35- ...	213	140	236	164	151	171
40- ...	192	126	215	137	162	157
All ages ...	100	100	100	100	100	100

Note.—The numbers of deaths for region Wales II (tabulated in Appendix XIII) were too small to justify the calculation of separate ratios for the two regions Wales I and Wales II.

The greatest variations are shown for haemorrhages and abortion and the smallest variations for toxæmias and sepsis. For each cause the risk increases with age to age 40 (with the one significant exception of toxæmias in the younger ages). After age 40, however, a small decrease in risk is shown for all groups except "Other Causes". The numbers of deaths on which the calculations are based are given in Appendix XIII, but it may be mentioned that in every case except one (haemorrhages, ages 15-25) at least 20 deaths are represented in the calculation.

Risk according to Parity.

It is probable that the index figures for parity are less reliable than those for age. Owing to the slight fall in the birth-rate between 1929 and 1934, the proportionate number of births in the fourth and subsequent pregnancy orders in the Table may be understated. Moreover, the sample of deaths taken (853 deaths investigated, 1929-34) is less representative than the 1,235 deaths (all deaths, 1929-33) taken for calculating index figures with reference to the age of the mother. It may, however, be pointed out that an examination of the proportionate age distribution of the 853 investigated deaths shows that the proportions in each age group are very close to those for the 1,235 puerperal deaths which occurred in Wales during 1929-33. The percentage of the 1,235 deaths in each age group is given in the Table on page 52, and the corresponding age group percentages for the 853 investigated deaths are given in Appendix XIV.

The general conclusion from the Table is that the risk of death is greatest for first pregnancies and lowest for the second, third and fourth pregnancies. Thereafter the risk is shown to

increase, but since most of the later pregnancies occur in the later ages, which is the period of heaviest mortality from child-birth, the higher index figures for later pregnancies may be due more to the age than the parity factor. The figures do not suggest any large variations for parity as for age, and indeed, the most striking comment on the figures is perhaps the comparatively small deviations from average except for first births and some of the later pregnancies.

It would be an advantage if statistics for parity could be collated in respect of all births and maternal deaths recorded in the country. The information would be known if the age of the mother and the number of previous pregnancies were stated in all cases at birth registration and the order of pregnancy as well as age on the certificate of death where the woman dies as a result of pregnancy or childbirth.

Risk according to Age and Parity.

In the case of the 853 investigated puerperal deaths both the age distribution and the pregnancy order were known. As pointed out above, the proportionate age distribution of these deaths corresponds very closely to that of all the deaths (1,235) which occurred during 1929-33, and it appeared that the sample was sufficiently large and representative to provide a reasonably reliable basis in the estimation of maternal risk for successive pregnancy orders in the several age groups.

The age and parity distribution of these 853 deaths are tabulated in Appendix XIV, and similar information for 35,367 births which occurred in 1934 is given on page 53. The statistics are presented in condensed age and parity groupings in the following Table:—

Age Period.	Births attended by Midwives, 1934.					Investigated Puerperal Deaths, 1929-34.				
	1st Preg-nancies.	2nd Preg-nancies.	3rd and 4th Preg-nancies.	5th and above Preg-nancies.	Total.	1st Preg-nancies.	2nd Preg-nancies.	3rd and 4th Preg-nancies.	5th and above Preg-nancies.	Total.
15- ...	6,850	2,621	957	56	10,484	124	29	13	1	167
25- ...	3,643	3,151	2,863	740	10,397	116	43	45	17	221
30- ...	1,386	1,656	2,531	1,917	7,490	55	46	51	39	191
35- ...	598	759	1,687	3,952	6,996	61	35	62	116	274
All ages	12,477	8,187	8,038	6,665	35,367	356	153	171	173	853

The total number of births (roughly five-sevenths of all births in 1934) was 35,367, and the total number of deaths 853 (roughly $3\frac{1}{2}$ times the mean annual number of puerperal deaths during 1929 to 1934). The age and parity distribution of births and deaths in Wales is not likely to have varied to any appreciable extent in recent years, which seemed sufficient justification for calculating, from the data in the Table, index

ratio figures for each separate age-parity group. In effect, the index figures which are given below express the percentage ratio which the probable true death-rate for each age-parity group bears to the death-rate for all pregnancies at all ages.

The method of calculation employed may best be explained by a few illustrations. The ratio of all births to deaths (35,367 to 853) is 100 to 2.411; and for first and second pregnancies in the 15-25 age group the respective ratios are:—

First pregnancies 6,850 to 124 = 100 to 1.810
Second „ „ 2,621 „ 29 = 100 „ 1.106

If the figure of 2.411 be expressed as 100 the 1.810 becomes 75 and the 1.106 becomes 46. The figures 75 and 46 are the index figures denoting the approximate risk of death at ages 15-25 for first and second pregnancies respectively in terms of a standard of 100 for all pregnancies at all ages.

The index figures in the following Table have been calculated in the manner described with reference to the examples quoted above:—

Relative Risk of Mortality at Childbirth at various Ages according to the Order of the Pregnancy (Mortality risk at all Ages = 100).

Age Group.	Order of Pregnancy.				
	1st Pregnancy.	2nd Pregnancy.	3rd and 4th Pregnancies.	5th and above Pregnancies.	All Pregnancies.
15- ...	75	46†	56†	—*	66
25- ...	132	57	65	95†	88
30- ...	165	115	84	84	106
35- ...	423	191	152	122	162
All ages ...	118	77	88	108	100

* No index figure calculated, as only one death is shown in this age-parity group.

† Index figure calculated on less than 30 deaths.

These ratio index figures can claim no exactness, and a margin for probable overstatement or understatement must be allowed. The figures can, however, be regarded as indicating with some approximation the relative risk of death at childbirth according to age and order of pregnancy. The groups in the Table above the dividing line show a risk below average and those below the line show a risk above average.

For first pregnancies the risk is shown to increase considerably with age, and after age 35 the mortality experience appears to be about four times that of all pregnancies at all ages. The lowest mortality rate occurs among second, third and fourth pregnancies in women under 30 years of age; for these childbirths a mortality rate of about one-half to three-quarters of the rate for all pregnancies at all ages is suggested. The mortality rate increases less with age after the first childbirth, and age does not appear to be a factor of great importance after the fourth childbirth. Generally speaking the risk of death is lower than average for most pregnancies after the first where the women are under 35 years of age. The risk is greatest for first and second pregnancies occurring after age 35, that is, in the parity orders which show the largest variations for age.

General Observations on Age and Parity.

During the last 40 years there has been very little change in the average age of marriage, but the birth-rate has fallen considerably. It is believed that the declining birth-rate has been due largely to extended knowledge of contraceptive methods. Restriction of families increases the proportion of first pregnancies, and a longer spacing of births tends also to increase the age of the mother at the birth of second and succeeding children. An increased proportion of first births and a higher age of childbearing would be reflected in a higher maternal mortality rate if there were no other factors, but it has to be borne in mind that among other factors there is now a smaller proportion of pregnancies of high parity (e.g. 7 or above), where the risks attending childbirth are in excess, than formerly.

It will be obvious that in the absence of data for periods earlier than 1929 no definite opinion can be expressed as to the influence which the falling birth-rate may have had on puerperal mortality in Wales. It may be remarked, however, that of the sample of 35,367 births in 1934, 21,686, or 61 per cent., occurred in the age-parity groups showing a maternal risk below average, and mostly in the under 30 age groups. Unless this proportion has changed appreciably in the last generation there are no strong grounds for believing that contraceptive practice, with the larger proportion of first pregnancies that results, has significantly influenced maternal mortality.

It is shown on page 52 that a larger proportion of births occur in the later childbearing ages in Wales II than in Wales I, and the extent to which, on a standardisation method, age differences alone could explain the higher mortality rate in Wales II have been estimated (page 54). Parity as well as age has to be considered, and although the statistical material

available was too small to estimate risk for parity separately for Wales II, it has been pointed out that fertility rates are higher in Wales II than in Wales I (page 10) and also that the risk of death increases less with age in Wales II than in Wales I. When the combination of age and parity is taken into account it may be that the unfavourable influence of age on the Wales II rates is counterbalanced by a more favourable position in regard to parity.

The added risks attached to first pregnancies and to pregnancies in the later age groups are familiar points of prognosis to obstetricians, and the tendencies shown in the Tables confirm the clinical impressions. The maternal mortality rate is likely at all times to be higher in some groups than in others, and the investigations suggest with some definiteness those age-parity groups which may be expected to have the highest and the lowest risks. It is felt that this information will be useful to all who are concerned with ante-natal work, and that age and parity should be considered in the measures taken for ante-natal care and treatment. It is obvious that particular attention should be given to those cases in the age-parity groups showing a risk above average; this might mean the admission of more of these cases into maternity homes, especially in those parts of Wales where the delivery would take place under difficult conditions and in unsatisfactory surroundings.

Mortality according to Marital Status.

Illegitimacy.

The illegitimate birth-rate is much higher in the rural than the industrial parts of Wales. For the ten years 1924-33 the illegitimate birth-rate for Wales was 41.8 per 1,000 live births; this compares with 43.7 for England during the same period. In the following Table the illegitimate birth-rates per 1,000 live births for different classes of area in Wales are shown for the two periods 1924-8 and 1929-33:—

		1924-8.	1929-33.
(1) <i>Industrial Areas.</i>			
County Boroughs	... ...	31.6	36.3
Glamorgan	... ...	31.5	37.4
*Industrial parts of the counties of Monmouth, Brecon, Car- marthen, Denbigh and Flint		33.6	37.6
(2) <i>Rural Areas.</i>			
*The rest of Wales	... ...	66.8	68.4
Wales	... ... ... ...	39.7	44.4

* For constitution of areas see Appendix II.

The illegitimate birth-rate for rural Wales is approximately double that for industrial Wales. It will be observed that in the two periods reviewed an increase in the rates is shown for the latter period for all classes of area.

Puerperal Mortality among Married and Single Women.

The puerperal death-rate is higher among single women than married women. The principal reason is probably lack of care during pregnancy and at confinement. The majority of illegitimate births are primiparous and there would be an added risk associated with primiparity, but on the other hand it is believed that most of these births occur among women under age 25, when the risk of mortality is lowest (see page 52). During 1924-33 there were 161 puerperal deaths among single women in Wales, and 94 of these women were under 25 years of age; of the 2,455 puerperal deaths among married women in only 404 cases (i.e. 1 in 6) was the woman under age 25.

Puerperal mortality rates per 1,000 live births among single and married women for the two periods 1924-8 and 1929-33 for the several classes of area are given in the following Table:—

Area.	1924-8.			1929-33.		
	Married Women.	Single Women.	Married and Single.	Married Women.	Single Women.	Married and Single.
<i>Industrial Areas.</i>						
County Boroughs	5.17	6.34	5.21	4.80	3.01	4.73
Glamorgan	5.40	8.68	5.51	6.07	11.92	6.29
Industrial parts of Monmouth, Brecon, Carmarthen, Denbigh and Flint	5.14	7.52	5.22	6.47	8.77	6.56
<i>Rural Areas.</i>						
Rest of Wales	5.08	9.33	5.36	5.41	7.50	5.56
Wales	5.22	8.27	5.34	5.74	8.11	5.85

The numbers of deaths on which the rates for single women are calculated, grouped according to separate cause of death, are as follows:—

Number of Puerperal Deaths among Single Women.

Area.	1924-8.				1929-33.			
	Sepsis (140 & 145).	Toxaemias (146 & 147).	Other Causes.	All Causes (140-150).	Sepsis (140 & 145).	Toxaemias (146 & 147).	Other Causes.	All Causes (140-150).
County Boroughs	8	2	1	11	3	2	—	5
Glamorgan ...	9	7	7	23	14	12	3	29
Industrial parts of Monmouth, Brecon, Carmarthen, Denbigh and Flint ...	5	6	5	16	5	7	5	17
Rest of Wales ...	10	19	6	35	5	8	12	25
Wales ...	32	34	19	85	27	29	20	76

For both periods there is a marked excess of puerperal mortality among single women, except in the county boroughs during 1929-33. It will be observed, however, that while the puerperal mortality rate among married women in Wales increased from 5.22 to 5.74 between 1924-8 and 1929-33, the rate for single women decreased slightly (from 8.27 to 8.11), so that the excess death-rate among single women was less in the latter quinquennium than during 1924-8.

The exceptionally high rate of 11.92 for single women in Glamorgan during 1929-33 calls for notice. The rate for Glamorgan for the previous period (1924-8) was high, and there has been a not inconsiderable increase in the illegitimate birth-rate (see Table on page 59). In contrast to this large increase for Glamorgan the mortality rate among single women for rural Wales decreased from 9.33 to 7.50.

The mortality rate among single women is lowest in the county boroughs, and the rate of 3.01 for 1929-33 (based, however, on only 5 deaths) is surprisingly low. One explanation may be that in the county boroughs better facilities are available for single women, in well-equipped homes and infirmaries, not only for labour but also for attention during the last few months of pregnancy. Social organisations exist in South Wales which are specially concerned with helping the single women in financial straits to meet the difficulties arising from confinement.

An increase in the illegitimate birth-rate is seen in all classes of area. It has been accompanied by a decrease in the puerperal mortality rate among single women in the county boroughs (which may be of little statistical significance), but an increase in the other industrial districts. The death-rates should be accepted with some reserve in all cases, as even the largest sample of deaths is only 35.

Separate Causes of Death.

The number of deaths among single women according to separate cause for the different classes of area are too small to enable any reliable conclusions to be formed from them. The majority of the deaths were from sepsis or toxæmias, the numbers in these groups in Glamorgan being proportionately very high in 1929-33. The proportionate number of deaths from toxæmias in Wales is much higher among single than married women, probably because of the influence of primiparity, which is much greater among illegitimate than legitimate births. The proportionate death-rates from sepsis, toxæmias and other causes among married and single women respectively in Wales during 1924-8 and 1929-33 is shown in the following Table:—

Cause of Death.	Married Women.		Single Women.	
	1924-8.	1929-33.	1924-8.	1929-33.
Sepsis	31.0	33.4	37.6	35.5
Toxæmias	25.7	25.9	40.0	38.2
Other Causes...	43.3	40.7	22.4	26.3
All Causes?	100.0	100.0	100.0	100.0

Influence of Illegitimacy on Puerperal Mortality.

Although the death-rate among single mothers exceeds that among the married, it will be evident from the statistics that even in rural Wales (where the illegitimate birth-rate is high)

the total effect of this excess upon the mortality of all mothers is not appreciable.

Stillbirths and Neo-natal Deaths.

It is known that there is a close association between maternal risk and risk to the infant life. The diseases that cause maternal death often produce stillbirth or cause the death of the infant. The number of stillbirths and neo-natal deaths, however, is much greater than the number of maternal deaths. Districts having high maternal death-rates have commonly also high foetal death-rates. Some attention, therefore, has been devoted to the incidence of stillbirths and of deaths among newly-born infants in Wales.

Stillbirths.

Stillbirth frequency has always been high in Wales. For each year since 1927, when the registration of stillbirths became operative, the Welsh stillbirth rates have shown a large excess over the rates for England. The stillbirth frequencies per 1,000 total births for 1928-33 were:—

Wales I	...	...	...	...	...	55
Wales II	...	...	...	...	...	52
Wales	...	...	...	...	...	55
England	...	...	...	...	...	40

The particulars available of 35,249 births (including 414 twin births) occurring from the 28th week of pregnancy included in the midwives' registers for 1934 show a stillbirth frequency of 49 per 1,000 births. This rate is lower than the rate of 53 per 1,000 births for all births registered in Wales in 1934 (numbering 42,203), but the difference is probably explained by the fact that most of the births not attended by midwives were delivered in hospital or other institutions.

Of 891 maternal deaths investigated in which death occurred after the 28th week of pregnancy, a stillbirth resulted in 467, or 52 per cent. of the cases, and in addition 844 women remained undelivered. In the following Table the investigated maternal deaths are arranged under five group causes of death. The Table shows the fate of the children in each group.

Condition of Child.	Sepsis.	Toxaemias.	Trauma.	Haemorrhages.	Intercurrent Disease.	Total Maternal Deaths.
Still-born ...	214	67	64	52	70	467
Alive ...	88	61	95	63	33	340
Undelivered ...	—	40	8	20	16	84
Totals ...	302	168	167	135	119	891
Percentage of :	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
(1) Stillbirths ...	71	40	38	39	59	52
(2) Live births ...	29	36	57	47	28	38

Neo-Natal Deaths.

There is a close relationship between the neo-natal death-rate and the maternal death-rate. Although the infant mortality rate for Wales, i.e. the death-rate of infants under 12 months, has decreased considerably during the last two decades, there has been little change in the neo-natal death-rate, i.e. of infants under 4 weeks. The following figures indicate the proportionate decline in mortality among infants in Wales since 1916-20 (1916-20 mortality rates per 1,000 live births expressed as 1,000).

			<i>Total</i> <i>under 1 year.</i>	<i>Under 4 weeks.</i>
1911-15	...	...	1,273	1,051
1916-20	...	...	1,000	1,000
1921-5	...	...	886	928
1926-30	...	...	808	952
1931	...	...	814	971
1932	...	...	759	953
1933	...	...	814	1,003
1934	...	...	708	1,007

The proportionate decline for England and Wales between 1916-20 and 1934 was from 1,000 to 651 for total infant mortality and from 1,000 to 846 for neo-natal mortality.

Male Excess for Stillbirths and Neo-natal Deaths.

The stillbirth frequency is consistently higher for males than females. The frequencies according to sex (per 1,000 male and per 1,000 female births respectively) for Wales during the three years 1932-4 were:—

		<i>Males.</i>	<i>Females.</i>	<i>Both Sexes.</i>
1932	...	59	52	56
1933	...	58	53	56
1934	...	56	51	53

Neo-natal mortality is also higher among males than females.

These differences suggest that there is an added difficulty when the mother is in labour with a male child.

Stillbirth and Neo-natal Mortality Variations for Age and Parity.

It has already been shown that there is a large increase in maternal risk in the later ages of childbearing and also for first pregnancies. To a smaller extent, also, there is increased maternal risk for the higher pregnancy orders, but since most of these pregnancies occur in late childbearing age this increased risk may be influenced more by age than parity.

In the following Tables statistics are given relating to stillbirths and deaths of infants within 10 days of birth, arranged according to the age of the mother and the parity position of the child. The rates are based upon data obtained from the Midwives' Registers, 1934. As regards stillbirths separate figures are given for the two regions Wales I and Wales II, but as regards deaths of very young infants the numbers in some groups were too small to justify separate tabulation for the two regions.

(1) *Stillbirths in Wales, 1934, in Regions—separate Age and Parity Groupings.*

Age Group.	Wales.		Wales I.		Wales II.	
	No. of Stillbirths.	Stillbirth Frequency per 1,000 total births.	No. of Stillbirths.	Stillbirth Frequency per 1,000 total births.	No. of Stillbirths.	Stillbirth Frequency per 1,000 total births.
All cases	1,731	49	1,312	49	419	49
<i>Age Periods *</i>						
15-	75	45	54	41	21	58
20-	322	37	243	35	79	43
25-	412	40	320	40	92	37
30-	383	51	275	50	108	54
35-	304	65	223	69	71	56
40+	207	88	163	92	44	75
<i>No. of Pregnancy</i>						
1	680	54	488	50	192	63
2	283	34	225	35	58	29
3	203	40	157	41	46	38
4	129	40	101	42	28	35
5	126	59	96	59	30	58
6 and 7	143	56	110	57	33	51
8 and above ...	167	78	135	81	32	68

* Age of mother was not stated in the case of 28 stillbirths.

(2) *Stillbirth Frequency in Wales, 1934, at various Ages according to the Order of Pregnancy.*

(For statistics of stillbirths in each age-parity group, see Appendix XIV.)

Age Group.	Stillbirth Frequency per 1,000 total births.				All Pregnancies.	Stillbirth Frequency in each Group per cent. of that for all Ages.				
	Order of Pregnancy.					Order of Pregnancy.				
	1st.	2nd.	3rd and 4th.	5th and above.		1st.	2nd.	3rd and 4th.	5th and above.	
15-	44	25	26	54	38	15-	92	52	54	79
25-	54	30	30	50	40	25-	111	63	62	82
30-	80	43	41	51	51	30-	166	89	85	106
35-	110	61	65	73	73	35-	229	126	134	152
All ages	54	34	40	64	48	All ages	112	71	83	100

* No index figure calculated, as only three stillbirths are shown in this age-parity group.

(3) Deaths of Infants within 10 days of birth in Wales, 1934.

Infant Deaths in Age Groups.			Infant Deaths in Parity Groups.		
Age Group.	No. of Deaths.	Death-rate per 1,000 live births.	No. of Pregnancy.	No. of Deaths.	Death-rate per 1,000 live births.
All ages	803	22.8	All Pregnancies	803	22.8
15-	36	22.5	1	313	26.2
20-	191	22.5	2	166	20.6
25-	215	21.5	3	91	18.9
30-	178	25.0	4	58	18.8
35-	112	25.8	5	55	27.5
40+	52	24.3	6 and 7	64	26.7
Age not stated	19	—	8 and more	56	28.7

Table (2) above shows that stillbirth frequency increases with age for all pregnancy orders, and especially for first pregnancies. The lowest frequencies are shown for second, third and fourth pregnancies under age 30. The risk of stillbirth is above average for all pregnancies after age 35, and a slight excess rate is shown for fifth and subsequent pregnancies in the 25-35 age period.

The variations in the stillbirth rates for age and parity are similar to those exhibited for puerperal death-rates in the Table on page 57. The age-parity groups showing the lowest risk of stillbirth also show the lowest maternal risk. In both cases, also, there is an added risk associated with primiparity, which increases considerably with age, and an excess rate for all pregnancy orders after age 35. It is interesting to observe, however, that after the fourth pregnancy the risk of a stillbirth increases relatively more than the risk of puerperal death.

Table (3) above, showing the death-rate among newly-born infants in age and parity groups, suggests that neo-natal mortality varies according to age and parity in much the same way as the puerperal death-rate and the stillbirth frequency vary. There is increased risk to the child at first births and at births after the fourth child, and also in childbirths where the mother is age 30 or older.

One point of interest (Table (1)) is that the stillbirth variations are greater for Wales I than for Wales II. Wales I shows lower rates for women under 25 and higher rates for women over 35. The Wales I rates are also lower for first births and higher for pregnancies after the third. Maternal risk has also been shown (page 52) to be relatively higher for Wales I than for Wales II at ages above 35.

There were no means of ascertaining whether a similar result would be shown if statistics for other years were examined.

All that can be said from the limited data available for examination is that it would appear that age and parity influence puerperal mortality and stillbirth frequency less in rural than in industrial Wales.

General Observations.

It is evident that the problem of the loss of child life at birth or shortly afterwards is closely related to the loss of life among the mothers; and it seems probable that if measures taken to reduce maternal mortality are successful, then a corresponding and no less satisfactory result will be found in the stillbirth rate and the neo-natal death-rate.

Presentation.

An analysis was made of those cases in which definite note of the presentation was recorded among the births attended by midwives in 1934, and the maternal deaths investigated during 1929 to 1934.

The numbers among the birth records were:—

				<i>Per cent.</i>
Vertex (including occipito posterior positions)			31,310	94.57
Malpresentations :				
Breech	...	...	...	3.56
Transverse	...	...	...	0.12
Face	...	...	...	0.39
Brow	...	...	...	0.11
Twin births	...	...	...	1.25
			414	
Total malpresentations			1,799	5.43

(In addition there were four cases undelivered.)

The numbers among the investigated deaths at or after the 28th week of pregnancy were:—

				<i>Per cent.</i>
Vertex (including occipito posterior positions)			655	84.72
Malpresentations :				
Breech	...	...	...	6.34
Transverse	...	...	...	2.98
Face	...	...	...	1.04
Brow	...	...	...	0.52
Twin births	...	...	...	4.40
			34	
Total malpresentations			118	15.28

(In addition there were 76 cases which were undelivered and in 59 cases the information as to presentation was not definite.)

The proportion of cases among the investigated deaths in which the presentation was not a normal vertex is set out in

the following Table according to cause of death. Undelivered cases are included in the totals.

	Total Deaths.	Cause of Death (28th week of pregnancy and after).				
		Sepsis.	Toxaemias.	Trauma.	Haemorrhages.	"Associated" Causes.
Vertex (including occipito posterior positions) ...	655	259	109	102	91	94
Malpresentations ...	118	32	11	48	20	7
Undelivered ...	(13.9 per cent.)	(11.0 per cent.)	(7.0 per cent.)	(31.0 per cent.)	(15.6 per cent.)	(6.0 per cent.)
	76	—	38	5	17	16
Totals ...	849*	291	158	155	128	117

* In 59 cases the information as to presentation was not definite.

It will be seen that trauma shows the highest proportion of malpresentation, and the percentage is high also for deaths from haemorrhage. It is low for "associated" causes. The puerperal death-rates and the stillbirth frequencies were also higher in 1934 among cases which had abnormal presentations (see Appendix XVIII). These results are what might be expected from clinical experience.

The conclusions suggested are:—

(1) The percentage of malpresentations to total births (5 per cent.) is not unusually high and malpresentation is not likely to be a factor of influence in producing the high maternal mortality rate in Wales.

(2) Malpresentation appears to increase the risk to the mother and to the child.

(3) The commonest causes of death in these cases are trauma and haemorrhage.

ABORTION.

It is known that abortion is not uncommon among pregnant women, and the ratio of abortions to childbirths has been stated by various observers to be from 14 to 25 per cent. It was not possible, however, from inquiries made during the investigations, to form any definite opinion regarding the ratio in Wales.

Classification of Deaths.

Deaths from abortion are classed under Group No. 140 (post-abortive sepsis) and No. 141 (abortion not returned as septic) in the International List. The heading "post-abortive sepsis" includes all deaths attributed to puerperal sepsis where abortion or miscarriage is said to have occurred, except those in which the duration of pregnancy is stated to have been seven months or over. Group No. 141 comprises deaths due to abortion, miscarriage (not further defined), or to premature birth or confinement stated or found on inquiry to have occurred after less than seven months' gestation, retention of dead ovum, accidental haemorrhage of pregnancy or ante-partum haemorrhage.

Deaths from criminal abortion, which comprise only inquest cases, are not classed in the death returns under a puerperal heading, but are assigned to the various forms of violence, e.g. suicide, murder, etc., in accordance with the verdicts returned by coroners' juries. The number of deaths in England and Wales assigned to criminal abortion during 1929-33 was 367, compared with 1,286 deaths assigned to Group Nos. 140 and 141. Separate figures relating to criminal abortion are not published for Wales, but the number of such deaths for the years 1924-33 have been supplied by the Registrar-General, and are given in detail on page 72.

Number of Deaths and Death-rate (excluding Criminal Abortion).

For the ten years 1924-33 the number of deaths from abortion in Wales assigned to Group Nos. 140 and 141 was 336, or 12.8 per cent. of the total puerperal deaths. An analysis of the deaths for the two regions of Wales for the two five-year periods is given below.

Deaths from Abortion (Groups 140 and 141).

	1924-8.		1929-33.	
	No. of Deaths.	Percentage of total Puerperal Deaths.	No. of Deaths.	Percentage of total Puerperal Deaths.
Wales I ...	147	Per cent. 14.1	130	Per cent. 14.1
Wales II ...	32	9.4	27	8.6
Wales ...	179	13.0	157	12.7*

* The corresponding percentage for England is 14.1.

The proportion of deaths from abortion to total puerperal deaths has remained constant for Wales I, but decreased slightly for Wales II, and the number of deaths from abortion has decreased for both regions. At the same time, however, the number of births has decreased. When the number of deaths from abortion is expressed per 1,000 live births an increase in the rate is shown for Wales I and a slight decrease for Wales II.

The figures are:—

*Death-rate from Abortion (Groups Nos. 140 and 141)
per 1,000 live births.*

	1924-8.		1929-33.	
Wales I	0.74	0.82
Wales II	0.54	0.52

The increase in the death-rate from abortion per 1,000 live births for Wales I between 1924-8 and 1929-33 is 10.8 per cent., but it does not follow that there has been an actual increase in the case fatality rate. If mortality were measured per number of abortions a different result might be shown. The *number of deaths* from abortion decreased between 1924-8 and 1929-33 both in Wales I and Wales II, and if the number of abortions decreased relatively less than the number of deaths from abortion (or increased) then it is clear that the case fatality rate must also have decreased between these two periods.

The method of measuring mortality risk from abortion with reference to births is not a satisfactory one. In the case of mortality from other puerperal causes the number of births gives very closely the number of women exposed to risk, because most births and puerperal deaths occur after the 28th week of pregnancy. The position in the case of abortion, however, is different. All these deaths occur before the 28th

week of pregnancy, and the only satisfactory standard of measurement of risk, therefore, is to relate these deaths to the number of women exposed to risk, i.e. to the number of abortions. Reliable information under this head, however, is not available. From inquiries made among doctors and nurses it would appear that abortion *per se* is not a common reason for calling in their services, and as a rule it is only where the condition of the woman gives rise to concern that their attendance is requested. It would be difficult to obtain statistics of the number of natural abortions, and there would always be a certain number of successful procured abortions which are not revealed except to the woman's intimate friends.

It has been shown above that 12.8 per cent. of the total puerperal deaths in Wales I during 1924-33 were due to abortion (excluding criminal abortion). If the proportion of abortions to total pregnancies was (as is probable) more than 12.8 per cent., then it can be assumed that the risk of death from abortion (excluding criminal abortion) is less than from other puerperal causes.

This process of reasoning can be carried a stage further, and be applied in the consideration of the available data as to the relative incidence of abortion in different areas. While, as shown above, a death-rate from abortion per 1,000 births does not accurately measure *actual* case fatality from this cause, it would provide a close measure of *relative* fatality as between one area and another if in the areas compared the ratio of abortions to births were approximately the same. In that case an excess mortality per 1,000 births shown for one area would be a real excess. It is not possible to say, however, whether in any two given areas the ratio of abortions to births is the same, or to what extent it varies. A higher abortion death-rate per 1,000 births in one area might be due wholly or in part to a larger proportion of abortions in that area; indeed it is conceivable for the area with the higher abortion death-rate *per 1,000 births* actually to have the lower case fatality rate.

The figures for Wales I and Wales II in the Table above may be examined in this light. It is there shown (1) that the death-rate from abortion is higher in Wales I than Wales II; and (2) that the death-rate has increased in Wales I but not in Wales II. These death-rates, however, are expressed per 1,000 births. It is possible that the higher and increasing death-rate for Wales I is not due so much (if at all) to a higher and increasing fatality rate, but to a greater and increasing incidence of abortion in industrial South Wales.

It has been ascertained from inquiries made among doctors and nurses that the number of abortions which they see in their practices has greatly increased in recent years. It was also

found in those institutions which admit abortion cases, that not only have admissions increased but that the type of case admitted nowadays is usually septic and gravely ill. The number of cases admitted to the three public assistance institutions serving the industrial parts of Glamorgan during each of the last five years was:—

	<i>Llwwynypia Hospital.</i>	<i>Penrhwytyn Infirmary.</i>	<i>Tydfil Lodge.</i>
1931	45	16
1932	65	22
1933	61	28
1934	60	30
1935	56	44
			45
			40

In order that the position may be studied for the several administrative areas the following figures showing the proportion of abortion (excluding criminal abortion) deaths to total puerperal deaths are given, with the figures for Wales II for comparison. The number of deaths from abortion in the separate areas, excluding Glamorgan, is small (see page 72), and it is not possible to form reliable conclusions from such limited data.

	Proportion of Abortion (excluding Criminal Abortion) deaths to total Puerperal Deaths.		Abortion Death-rate (excluding Criminal Abortion) per 1,000 live births.	
	1924-8.	1929-33.	1924-8.	1929-33.
	Per cent.	Per cent.	Per cent.	Per cent.
<i>Administrative Counties.</i>				
Glamorgan ...	17.9	15.6	0.99	0.98
Monmouth ...	12.3	11.7	0.54	0.72
Carmarthen ...	3.9	11.1	0.24	0.74
Brecon ...	11.1	16.7	0.54	0.67
<i>County Boroughs.</i>				
Cardiff ...	20.9	14.5	1.04	0.65
Merthyr Tydfil ...	8.7	23.3	0.54	1.26
Newport ...	4.9	17.2	0.21	0.63
Swansea ...	9.0	9.3	0.51	0.50
Wales I ...	14.1	14.1	0.74	0.82
Wales II ...	9.4	8.6	0.54	0.52
Wales ...	13.0	12.7	0.69	0.74

It was also found that of the 853 puerperal deaths investigated by Medical Officers of Health during 1929-34 the proportion of abortion to total puerperal deaths was much greater in Wales I (11.9 per cent.) than in Wales II (5.2 per cent.).

For England the death-rate from abortion (excluding criminal abortion) during 1929-33 was 0.59 per 1,000 live births, and the percentage of abortion deaths to total puerperal deaths was 14.1. Abortion thus seems to be as frequent a cause of puerperal death in England as in Wales I (accounting for 14.1 per cent. of total deaths in both cases), but it should be remembered that puerperal mortality is lower in England than in Wales I. The mortality rate from abortion per 1,000 births is much higher in Wales I than in England, suggesting either a higher case fatality or a greater incidence of abortion, or possibly a combination of both.

Mortality from abortion is relatively low in rural Wales and it may be concluded that the incidence of abortion is also low.

Criminal Abortion.

The statistics so far given relate only to deaths from abortion assigned to a puerperal heading (Group Nos. 140 and 141). They do not include deaths from criminal abortion, which are classed in the returns of the Registrar-General as deaths from violence.

The statistics of deaths from criminal abortion show that mortality from this cause is much higher in industrial Wales than in rural Wales and that the number of deaths increased between the two periods 1924-8 and 1929-33. Comparative figures of all abortion deaths for different areas of Wales are given in the the following Table:—

Administrative Area.	1924-8.					1929-33.				
	No. of Abortion Deaths.			Per-cent-age of Criminal to total Abortion Deaths.	Total Abortion Death-rate per 1,000 live Births.	No. of Abortion Deaths.			Per-cent-age of Criminal to total Abortion Deaths.	Total Abortion Death-rate per 1,000 live Births.
	Puer-peral (Nos. 140 and 141).	Criminal Abortion	Total.			Puer-peral (Nos. 140 and 141).	Criminal Abortion	Total.		
<i>Administrative Counties.</i>										
Glamorgan ...	83	13	96	Per cent. 13.6	1.14	64	18	82	Per cent. 22.0	1.26
Monmouth ...	20	5	25	20.0	0.67	22	8	30	26.7	0.99
Carmarthen ...	4	—	4	—	0.24	10	3	13	23.1	0.97
Brecon ...	3	—	3	—	0.54	3	—	3	—	0.67
<i>County Boroughs.</i>										
Cardiff ...	23	3	26	11.6	1.17	12	2	14	14.3	0.76
Merthyr Tydfil ...	4	—	4	—	0.54	7	1	8	12.5	1.43
Newport ...	2	1	3	33.3	0.32	5	1	6	16.7	0.76
Swansea ...	8	1	9	11.1	0.57	7	2	9	22.2	0.65
Total for Wales I	147	23	170	13.6	0.85	130	35	165	21.2	1.04
Total for Wales II	32	1*	33	3.0	0.55	27	1†	28	3.6	0.54
Total for Wales	179	24	203	11.8	0.79	157	36	193	18.7	0.91

* One death in Caernarvonshire, 1926.

† One death in Merionethshire, 1931.

The percentage of deaths from criminal abortion to total abortion deaths for England for 1929-33 was 16.1, and the total abortion death-rate (including criminal abortion) was 0.71 per 1,000 live births. The respective figures for Wales shown in the preceding Table are 18.7 and 0.91.

The Table shows that for the ten years 1924-33 there were 60 deaths from criminal abortion in Wales, i.e. an average of six deaths a year. This is not a large number. All but two of the deaths occurred in South Wales; 11 in the county boroughs, 31 in Glamorgan, 13 in Monmouthshire, and three in Carmarthenshire. The only other deaths were one in Caernarvonshire and one in Merionethshire.

The incidence of mortality from criminal abortion appears to be particularly high in Glamorgan, although for this administrative county there was an average of only three criminal abortion deaths a year. Glamorgan is the largest and most industrial county in Wales, with a population of roughly 750,000, including 98,000 married women of ages 15-45, so that three deaths a year on this population does not suggest a mortality problem of any magnitude.

The number of deaths from criminal abortion in rural Wales appears to be negligible.

The most significant feature of the figures is the noticeable increase of the number of deaths from criminal abortion in Wales I between 1924-8 and 1929-33, namely, from 23 to 35. During the same two periods the number of deaths from abortion other than criminal abortion decreased from 147 to 130. The total of all abortion deaths thus decreased from 170 to 165. This decrease is no doubt partly the result of the decrease in the number of births, although a fall in the birth-rate does not necessarily mean a fall in abortion incidence, which would not fall correspondingly if there is increased resort to the practice of procured abortion. While the total number of deaths from abortion decreased from 170 to 165, the ratio of criminal abortion to total abortion deaths for Wales I increased from 13.6 to 21.2 per cent. (for Wales II the percentage was practically stationary at 3 per cent.).

It is evident that abortion as a cause of death resulting from pregnancy is becoming of relatively greater importance in industrial South Wales. There may be more than one reason to explain the relative increase in mortality shown in the above Table, and the possibility that the actual risk of death has increased must not be ruled out. If there is now more interference with the natural course of pregnancy than formerly one would expect an increased mortality risk. Circumstantially, however, the figures give strong reasons for the view that the practice of procured abortion is on the increase, and that this

is the principal contributory reason for the remarkable differences between the figures for Wales I and Wales II. It appears probable that abortion is more prevalent in South Wales than in England, but the data are insufficient to justify any definite opinion on this point.

It is not unlikely that some of the deaths from abortion assigned to a puerperal heading (Group Nos. 140 and 141) were the result of interference but were returned as due to natural causes in the absence of evidence of a contrary nature. A death from abortion is only likely to be the subject of a coroner's inquest if a strong *prima facie* case exists for reference to a coroner's court. Even when a case does come before a coroner the jury will hesitate to return a verdict which amounts to suicide or murder unless the evidence is clearly established. Cases of death due to the taking of violent drugs and abortifacients, though in reality they are procured abortions, usually escape the publicity of a coroner's inquest. There is evidence that many abortion deaths have occurred which were returned as due to natural causes when in fact there was very strong suspicion that abortion had been procured.

The very low proportion of criminal abortion to total abortion deaths in Wales II (only 3 per cent.) calls for comment. From inquiries made it would appear that the practice of procured abortion is infrequent in rural Wales. An explanation of the striking contrast in the figures for the two Welsh regions may be that in rural areas the women are less sophisticated and are less familiar with measures, well-known in urban communities, which may succeed in terminating pregnancy.

Abortion among Unmarried Mothers.

It has been shown elsewhere (page 59) that the illegitimate birth-rate is high in rural Wales, being twice the rate for industrial Wales, which is below the average for England. It has been shown in this chapter that abortion as a cause of death is relatively more common in industrial than in rural Wales, and it seemed desirable to examine whether any relationship might be discovered between the high illegitimate birth-rate and the low abortion death-rate in rural Wales. The statistics show that although deaths from abortion (excluding criminal abortion) do not enter largely into puerperal mortality in rural Wales, among single women abortion is an important contributory cause of death, much more so than among single women in industrial Wales.

How many of the 60 deaths from criminal abortion during 1924-33 occurred among single women is not known, but in any case the number in Wales II could not have exceeded two, since only two deaths occurred among the married and single

women combined. For abortion other than criminal abortion, however, 16.9 per cent. of the total puerperal deaths in Wales II during 1924-33 were among single women (see Table below). In Wales I only 6.5 per cent. of the deaths from abortion occurred among single women. Abortion (excluding criminal abortion) thus appears to be a more common cause of puerperal death among single women in rural areas than in urban areas.

Deaths from Abortion according to Marital Status and Age.

Particulars of the deaths from abortion and from other puerperal causes in Wales I and Wales II according to marital status and age are given in the following Tables:—

(1) Number of Deaths from Abortion, 1924-33.

	Wales I.		Wales II.	
	Married.	Single.	Married.	Single.
Abortion (Nos. 140 and 141) ...	259 (93.5 per cent.)	18 (6.5 per cent.)	49 (83.1 per cent.)	10 (16.9 per cent.)
Other Puerperal Causes (Nos. 142-150)	1,599 (94.8 per cent.)	88 (5.2 per cent.)	548 (92.4 per cent.)	45 (7.6 per cent.)

(2) Age distribution of the Deaths (among married and single women separately).

Cause of Death.	All Ages.			15-			25-			35-		
	Married.	Single.	Total.	Married.	Single.	Total.	Married.	Single.	Total.	Married.	Single.	Total.
Abortion (Nos. 140 and 141). Wales I.	259 49	18 10	277 59	23 4	12 3	35 7	122 20	6 6	128 26	114 25	— 1	114 26
Total for Wales ...	308	28	336	27	15	42	142	12	154	139	1	140
Other Puerperal Causes (Nos. 142-150). Wales I.	1,599 548	88 45	1,687 593	304 73	58 21	362 94	751 276	30 16	781 292	544 199	— 8	544 207
Total for Wales ...	2,147	133	2,280	377	79	456	1,027	46	1,073	743	8	751

(3) Age distribution of the Deaths, with Deaths from Criminal Abortion added (deaths among married and single women combined).

	All Ages.	15-	25-	35-
Criminal Abortion	60 (100 per cent.)	14 (23.3 per cent.)	29 (48.4 per cent.)	17 (28.3 per cent.)
Abortion (Nos. 140 and 141) ...	336 (100 per cent.)	42 (12.5 per cent.)	154 (45.8 per cent.)	140 (41.7 per cent.)
Other Puerperal Causes other than abortion (Nos. 142-150).	2,280 (100 per cent.)	456 (20.0 per cent.)	1,073 (47.1 per cent.)	751 (32.9 per cent.)

It will be seen that a larger proportion of deaths from abortion (excluding criminal abortion) than of other puerperal deaths occurred among women in the later ages of childbearing. As in the case of stillbirth the risk increases with age. In the case of criminal abortion, nearly one-fourth (23.3 per cent.) of the deaths occurred among women under 25 years of age. This figure, which is based on only 14 deaths, compares with 20 per cent. for puerperal causes other than abortion; the two percentages thus closely correspond, and are much larger than the percentage of 12.5 shown for abortion other than criminal abortion. The statistics are suggestive that procured abortion, in contrast to natural abortion, may be relatively more common in the younger ages, although there are no strong grounds for this opinion.

Puerperal Mortality Rates, including and excluding Abortions.

The following Table shows the differences between the puerperal mortality rates per 1,000 live births for Wales I and Wales II, for the period 1924-33, (i) when abortion deaths are included; (ii) when abortion deaths are excluded. The excess mortality in Wales II over Wales I is 12.7 per cent. when all abortions are excluded, compared with 3.7 per cent. when all abortions are included.

	<i>All Puerperal Causes</i> (<i>Nos. 140-150</i>), <i>i.e., including</i> <i>Abortion</i> (<i>Nos. 140-141</i>).	<i>All Puerperal Causes</i> (<i>Nos. 140-150</i>), <i>plus Criminal</i> <i>Abortion.</i>	<i>Puerperal Causes</i> <i>less all</i> <i>Abortions</i> (<i>i.e., Nos. 142-150</i>).
Wales I ...	5.49	5.65	4.71
Wales II ...	5.84	5.86	5.31
Wales ...	5.57	5.70	4.86

General Considerations.

The following inferences are suggested from the consideration of the available data relating to abortion:—

(1) Abortion plays a more important part in contributing to maternal mortality in industrial Wales than in rural Wales.

(2) The number of deaths from abortion is relatively high in industrial Wales and the abortion death-rate per 1,000 births is increasing. This is probably due to a combination of two factors:—

(a) a high and increasing number of abortions relative to pregnancies;

(b) a high case fatality, which is influenced by the tendency to procure abortion by interference.

(3) Criminal abortions (as shown by inquest cases) are much more frequent in the industrial than the rural areas, and their actual numbers have increased. The number of abortions other than criminal abortion has decreased both in industrial and rural Wales.

(4) The risk of death from spontaneous abortion appears to be less than the risk of death from other puerperal causes. The probability is, however, that the case fatality in procured abortion is much greater, although there is no means of obtaining conclusive evidence on this point.

VI.

GENERAL ILL-HEALTH.

The Influence of Non-Puerperal Disease.*Non-Puerperal Disease among the Investigated Deaths.*

The following is an analysis of the deaths investigated during 1929-34 showing cases where there was a history of non-puerperal disease:—

	Number of Deaths.	Cause of Death.					
		Sepsis.	Toxaemias.	Trauma.	Haemorrhages.	Intercurrent Disease.	Abortion.
(1) All Maternal Deaths ...	1,079	307	200	169	150	138	115
(2) Deaths with history of non-puerperal disease ...	415	106	49	63	37	127*	33
(3) Percentage of (2) to (1) ...	38.5	34.6	24.5	37.3	24.7	92.0	28.7

* In addition there were 11 cases where intercurrent disease was the cause of death but onset was after labour.

For sepsis and trauma in particular there was a history of non-puerperal disease in a high proportion of the deaths.

In 38 per cent. of the maternal deaths some form of non-puerperal disease was present, and if puerperal deaths only are examined (see Table below), the percentage is 29. It is probable that the general ill-health was an auxiliary factor in many of these cases. From statements made by doctors and others it would appear that there is a good deal of avoidable ill-health among the women of Wales.

—	Wales I.	Wales II.	Total.
Maternal deaths	867	212	1,079
Cases of definite evidence of non-puerperal disease ...	338 (39.0 per cent.)	77 (36.3 per cent.)	415 (38.5 per cent.)
Deaths certified as puerperal	683	170	853
Cases with non-puerperal disease	204 (29.9 per cent.)	46 (27.1 per cent.)	250 (29.3 per cent.)

In compiling this Table care was taken to exclude all doubtful conditions such as "debility" or a "history of ill-health", and only cases suggesting definite evidence of disease have been included.

The different morbid conditions are set out in Appendix XVII, but no analysis has been made because the figures are too small for proportionate dissection.

The proportion of cases in which there was non-puerperal disease is considerably higher than in any sample of successful births that has been taken. It will be observed from the above Table that there is little difference in the proportions among the deaths in the two Welsh regions.

Relationship between Puerperal and Non-Puerperal Mortality.

Since general disease among mothers is known unfavourably to influence the course of pregnancy it was considered desirable to examine local death-rates to see whether any relationship could be shown between a high puerperal mortality rate and a high incidence of non-puerperal disease and vice versa. It was reasonable to expect that if pre-existing disease is an important contributory cause of puerperal mortality, districts with a high puerperal death-rate would, generally speaking, be areas where non-puerperal disease is also found to be in excess.

No statistics are available showing the relative incidence of morbidity (as distinct from mortality) in various parts of the country, and the statistics of comparative mortality had therefore to be examined. A statement was first of all prepared giving comparative mortality figures for each county and county borough in Wales (see Appendix XV). Separate figures are there shown for (i) puerperal mortality per 1,000 live births, and (ii) mortality from all causes, tuberculosis, and non-puerperal causes per 1,000 of the female population of ages 15-45. Separate figures for married females could not be given.

The evidence that any relationship exists between a high puerperal and a high non-puerperal death-rate is inconclusive from these figures. Puerperal mortality, however, is high throughout Wales, and there are no areas of consistently low mortality to select for contrast. Further, the counties and county boroughs of Wales have for the most part relatively small populations, and where the number of deaths is small a death-rate, even over a period of more than one year, may not be a suitable index for the purpose of comparative study. This matter has already been discussed on page 17.

It was felt, therefore, that no comparison of value was possible from statistical data confined to Welsh areas. In England there are regions of low as well as of high puerperal mortality, and the question has therefore been examined further by contrasting the death-rates for the two Welsh regions, Wales I and Wales II,

with those for English regions. A convenient regional grouping for comparative purposes was available in the separate statistics relating to each of the twelve geographical divisions into which the Registrar-General has divided England and Wales.

The following Table gives figures of comparative mortality from puerperal causes, and from non-puerperal causes among women of childbearing age, for these twelve regions. An additional column shows the percentage variations in the general death-rate at all ages from the death-rate for England and Wales.

Region.*	Puerperal Mortality, 1931-3 ; Percentage of England and Wales mortality rate (per 1,000 births).	Mortality from All Causes at all Ages (standardised) for Females, 1931 : Percentage of England and Wales rate (per 1,000 population).	Mortality from Non-Puerperal Causes for Females, 1931 ; Percentage of England and Wales rate (per 1,000 population).		
			15-25	25-35	35-45
England and Wales	100	100	100	100	100
<i>Wales.</i>					
Wales II (mainly rural) ...	144	108	131	131	121
Wales I (industrial South Wales)	134	117	153	132	118
<i>England.</i>					
North III (Yorks, W. Riding)...	125	111	109	100	108
North II (Cumberland, Westmorland and parts of Yorks.) ...	117	110	111	97	102
North I (Durham and Northumberland)	114	124	135	121	117
North IV (Lancs. and Cheshire)	103	117	109	116	113
South West (mainly rural) ...	93	87	91	101	105
Midland II	94	97	96	97	101
Midland I	91	99	95	94	100
East (mainly rural)	87	87	91	92	92
South East, other than Greater London	88	80	77	86	86
Greater London	86	92	88	89	86

* For the constitution of the Regions, see Appendix III.

The two Welsh regions recorded in 1931-3 a higher puerperal mortality rate than any of the ten English regions. The Welsh regions also show the highest non-puerperal death-rates among women of childbearing age in each of the three age groups 15-25, 25-35, and 35-45 (with one small exception in the 15-25 age group). In contrast the regions in England with the lowest puerperal mortality rates have also the lowest non-puerperal death-rates. Wales and Northern England have a general death-rate and a puerperal death-rate above average, and in the rest of the country the death-rates are below average.

The relationship between the death-rate from childbearing and from general disease indicated in the Table, considered in conjunction with the high incidence of non-puerperal diseases among the investigated puerperal deaths in Wales, suggests that the excess of mortality arising from childbearing in Wales is due in part to the higher incidence of intercurrent disease among the mothers in Wales—the presence of intercurrent

disease adding a further risk to the risks attending pregnancy and parturition.

It may here be observed that the general death-rate was higher in Wales than in England in the years preceding the War, and the Welsh excess has become greater in recent years. Both in 1911-4 and in 1931-4 all the Welsh county boroughs had a general death-rate above the English rate. As regards the counties, six Welsh counties in 1911-4 and only one (Radnor) in 1931-4 had a general death-rate below the English rate. The death-rate has declined considerably both in England and in Wales, but the decline has been less in Wales, ranging from 21 to 30 per cent. in the county boroughs and 17 to 26 per cent. in the counties.* Meanwhile an increase is recorded in the puerperal death-rate.

General Observations.

The question of how the general health of the mothers can be improved is to some extent an economic one involving ways and means of maintaining women of childbearing age in optimum health by good nutrition and good sanitary environment. Added to these there must be better education of girls and women in domestic and personal hygiene.

It is to be hoped that the Local Authorities will give this matter their careful consideration and make more effective use of their powers for disseminating health knowledge. At various times attention has been drawn to this need by the Welsh Board of Health, and particularly as a result of the surveys of public health services made under Section 104 of the Local Government Act, 1929. The surveys have disclosed the need for the further enlightenment of the people in matters pertaining to personal and domestic hygiene and to diet. There is no doubt that a good deal of the ill-health among mothers is due to ignorance, carelessness and neglect, and the remedy for this state of affairs lies largely in their own hands, helped by the sympathetic work of health bodies. Emphasis must be laid upon this point, as care and attention by the woman herself to the hygiene of pregnancy is possibly as important in reducing the high maternal mortality rate as is the provision of expensive maternity services.

Diseases of Non-Puerperal Origin.

A history of non-puerperal disease was mentioned in 415 maternal deaths investigated by Medical Officers of Health.

* See the Registrar-General's Statistical Review (Text) of England and Wales, 1934, pp. 145 and 147.

In Appendix XVII these deaths are classified according to the non-puerperal condition present at death, and also according to whether the cause of death was given a puerperal or an "associated" causes classification. The deaths are separately analysed according to (1) cause of death as certified, and (2) cause of death as classified after scrutiny of the case papers, and it will be observed that wide variations occur between the two sets of figures.

Observations on the various non-puerperal conditions are given below.

1. Diseases of the Heart.

There were 103 maternal deaths in which disease of the heart was present; in 31 the certified cause of death was puerperal, and in 72 non-puerperal. The causes of death in this total as re-classified were 54 puerperal and 49 non-puerperal respectively.

The conduct of pregnancy in a heart case is often difficult, and there are differences of opinion with regard to the method of treatment in these conditions. There seemed to be no doubt, however, that in a number of cases induction of abortion under proper conditions would have been a less risky procedure than allowing pregnancy to continue. The judgment required to decide whether the pregnancy should be terminated involves the closest collaboration between the obstetrician and the physician. Many instances were found, however, where skilled advice was not available, or if available, was not utilised; and there is need in this class of case for much greater care during the ante-natal period.

2. Diseases of the Renal System.

There were 57 maternal deaths in which kidney disease was present; in 43 the certified cause of death was puerperal and in 14 non-puerperal. The causes of death as re-classified were 32 puerperal and 25 non-puerperal respectively.

The incidence of renal diseases appears to be particularly high in Wales, especially among women of childbearing age, and it is probable that this high incidence affects puerperal mortality by

- (a) increasing the gravity of the prognosis in puerperal conditions such as sepsis and haemorrhage;
- (b) increasing the incidence of abortion; and
- (c) the dangerous alliance of renal diseases with the toxæmias of pregnancy.

The heavy excess of mortality from the toxæmias of pregnancy in Wales is well shown from the following figures relating to the years 1929-33:—

	Wales I.	Wales II.	Wales.	England.	Percentage excess of Welsh rate over English rate.
Death-rate per million from Nephritis (Females ages 15 to 45)	156	148	154	109	41.3
Puerperal death-rate per 1,000 live births:—					
Sepsis (140-145)	1.97	1.94	1.96	1.75	12.0
Toxæmias (146-147) ...	1.58	1.50	1.56	0.80	95.0
Other causes	2.25	2.57	2.33	1.65	41.2
Total puerperal causes (140-50) ...	5.79	6.01	5.85	4.20	39.3

The opposite effect, namely, that of pregnancy upon renal function, must also be considered as a possible contributory factor in producing the high death-rate from nephritis among women of childbearing age.

3. *Infective Conditions.*

Included under this heading are tuberculosis, influenza, venereal diseases and a group which contains other infective conditions such as erysipelas, scarlet fever, and pyogenic infections (excluding gynaecological conditions).

(a) *Tuberculosis*.—There were 27 maternal deaths where tuberculosis was present; in 13 the certified cause of death was puerperal and in 14 non-puerperal. The causes of death as re-classified were 15 puerperal and 12 non-puerperal respectively.

Cases of healed pulmonary tuberculosis have not been admitted into the totals of this group, as they have not been regarded as suffering from a pre-existing non-puerperal disease; but clinically a pregnant woman with such a history should always receive special observation during the ante-natal period.

Since the War there has been a rise in the tuberculosis death-rate among young women in industrial Wales and this increased death-rate has possibly had a slight effect upon the maternal mortality rates.

(b) *Influenza*.—There were 28 maternal deaths where influenza was present; in 8 the certified cause of death was puerperal and in 20 non-puerperal. The causes of death as re-classified were 15 puerperal and 13 non-puerperal respectively.

A tendency has been noticed, especially during an epidemic, to impute to influenza clinical phenomena which quite possibly were due to puerperal sepsis, with the result that the diagnosis

and consequently the treatment of the sepsis were delayed. When puerperal sepsis supervenes in a case of influenza the distinction becomes even more difficult, and death in the cases examined was probably in many instances hastened because of the delayed treatment of the septic condition as well as the prejudicial action of the influenzal condition.

(c) *Venereal Diseases*.—There were 13 maternal deaths where venereal disease was present; in 12 the certified cause of death was puerperal and in 1 non-puerperal. All the 13 deaths on re-classification were assigned to a puerperal cause.

Little evidence could be obtained because investigation made after death upon this subject is difficult; but there is reason to believe that venereal diseases were contributory to death in a number of cases where no mention of this condition was recorded.

(d) *Other Infective Conditions*.—This group contains cases of erysipelas, scarlet fever, infected wounds, pyogenic abscesses and the like. There were 20 deaths where these conditions were present; in 17 the certified cause of death was puerperal and in 3 non-puerperal. The causes of death as re-classified were 18 puerperal and 2 non-puerperal respectively.

As might be expected the majority of deaths were caused by puerperal sepsis and were, therefore, classed as puerperal. Some of the deaths investigated occurred during small outbreaks of puerperal sepsis.

4. *Gynaecological Diseases*.

There were 42 maternal deaths where gynaecological conditions were present; in 34 the certified cause of death was puerperal and in 8 non-puerperal. The causes of death as re-classified were 40 puerperal and 2 non-puerperal respectively.

The description of many of these diseases suggested that they were the sequelae of previous labours. Although these conditions do not of themselves cause death, they prejudice prognosis of a case which is not completely normal in other respects. For example, puerperal sepsis might supervene upon a case of cervicitis, and haemorrhage upon a case of fibroids of the uterus; and the circumstances may be such that the presence of the local disease overbalances the scale between survival and death. These conditions are often easily recognised from careful ante-natal examination, and although the treatment of the case may be difficult, proper precautions taken in time should lessen the risk at labour; and in extreme cases the termination of pregnancy at an early stage would be less dangerous than allowing pregnancy to continue.

5. *Anaemia and Diseases of the Blood.*

There were 35 maternal deaths where anaemia or other diseases of the blood were present; in 25 the certified cause of death was puerperal and in 10 non-puerperal. The causes of death as re-classified were 28 puerperal and 7 non-puerperal respectively.

In this group care has been taken to exclude cases where the notes were indefinite; and only those cases were included where there was incontrovertible evidence that a diagnosable degree of anaemia was present. In addition, anaemia secondary to other non-puerperal diseases mentioned in this section has, of course, been excluded.

In many cases, no doubt, the anaemia could have been shown to be secondary to pregnancy. In others the diagnosis was shown to be definitely pernicious anaemia or some other pathological condition of the blood.

There are, however, a sufficient number of cases (35) to show that anaemia is not uncommon, and often appeared to be of sufficient degree to increase the gravity of the prognosis in a puerperal cause of death. There is evidence that the incidence of anaemia is high both in rural and in industrial Wales, and that simple treatment with iron is found to be particularly effective in these cases. Some of the older practitioners said that while there had been a great decrease in chlorotic anaemia of young women (and this decrease Wales has shared with England), there was still a considerable amount of anaemia among the older women of childbearing age. There appears to be no doubt that there is a deficiency of iron in the diet of the people both in the industrial and rural districts, and the remarkable effects of therapeutic doses in many cases appear to bear out the opinion that this deficiency of iron is in part responsible for the anaemias.

6. *Diseases of the Respiratory System.*

There were 27 maternal deaths where diseases of the respiratory system (excluding pulmonary tuberculosis and influenza) were present; in 18 the cause of death was puerperal and in 9 non-puerperal.

Pneumonia and bronchitis were the most common diseases in this group; and most of the cases who died from "associated" causes were beyond hope of recovery.

7. *Miscellaneous Diseases.*

The numbers in the remaining groups are small taken separately, but in the aggregate total 63. In 49 the certified cause of death was puerperal and in 14 non-puerperal. The

causes of death as re-classified were 55 puerperal and 8 non-puerperal respectively.

While it is not maintained that these non-puerperal diseases concomitant with pregnancy and childbirth were the direct cause of death from childbirth, in many they exerted an important influence. In an area where the incidence of these diseases among women is high, it may be expected that a higher puerperal death-rate will be recorded than in an area having a low incidence of these diseases. A high incidence of these diseases appears to be general in Wales.

It may also be inferred that if the incidence of actual disease is high in Wales, then the less well-defined conditions of ill-health are common; and they in their turn are likely to have an appreciable though less powerful influence upon the risk of death from maternal causes.

VII.

MATERNAL MORTALITY IN THE SPECIAL AREAS.

High rates of unemployment have been registered in most parts of Wales for several years. Rural and industrial areas have both felt the effects of trade depression, but it is in the South Wales coalfield area that unemployment has been most acute. Many of the districts comprising this region have been scheduled as "Special Areas" under the Special Areas (Development and Improvement) Act, 1934, that is, "areas which have been specially affected by industrial depression" and as such are eligible for assistance under the arrangements provided by that Act.

Until 1923 South Wales enjoyed a substantial measure of trade prosperity. Since that time, and more particularly since 1929, unfavourable economic conditions have existed throughout the area, largely owing to the decline in the coal export trade. The mining valleys, and especially the northern section of the coalfield, have been more affected than the adjacent centres of the iron, steel and tin-plate industries.

Population in the Special Areas.

Roughly, four persons out of every ten in Wales live in the Special Areas, and in the administrative counties of Glamorgan and Monmouth four out of every five. The only Special Areas in Wales outside these administrative counties are the Merthyr Tydfil County Borough (population 68,700); the Brynmawr Urban District (population 7,110), the Crickhowell Rural District (population 6,955) and the Vaynor and Penderyn Rural District (population 5,561) in Breconshire; and the Borough of Pembroke (population 12,230).

The following Table shows the geographical distribution of the population of Wales (1934) as between the Special Areas and other areas:—

		Population in Special Areas.	Population not in Special Areas.	Total Population, 1934.
County Boroughs	...	68,700*	474,200	542,900
Glamorgan	...	585,146	166,504	751,650
Monmouthshire	...	287,420	51,530	338,950
Rest of Wales	...	31,856	889,044	920,900
Wales	...	973,122	1,581,278	2,554,400

* Merthyr Tydfil.

Death-rate from Puerperal and from Non-Puerperal Causes in the Special Areas.

It has already been shown that there appears to be some correspondence between puerperal and non-puerperal mortality rates. A reference to the Table on page 80, considered in relation to the unemployment statistics of the Ministry of Labour, also shows that the regions of heavy unemployment are the regions with the highest puerperal mortality rates and vice versa. This fact is mentioned as one of interest and does not necessarily suggest a link between health standards and conditions of employment. It should be pointed out that in industrial South Wales the general death-rate, the puerperal death-rate and the infant mortality rate were high even in the days of trade prosperity. The highly industrialised character of the area on the South Wales coalfield is probably in itself one explanation of the continued high mortality rates in this region. In Cardiff, Newport and Swansea, which are commercial more than industrial centres, the puerperal mortality rate is lower.

The highest puerperal mortality rates in Wales for 1929-33 occurred in Glamorgan and the industrial parts of Monmouthshire, Carmarthenshire and Denbighshire (see page 25). All these areas show a death-rate above 6 per 1,000 births. The statistics for Glamorgan and industrial Monmouthshire broadly represent the level of mortality in the Special Areas, and in these two counties and in the County Borough of Merthyr Tydfil (a Special Area) the non-puerperal death-rate for women of child-bearing age is also high. Expressing the non-puerperal death-rate, 1931-3, for women in Wales at ages 15-45 as 100, the ratio for Merthyr Tydfil is 133, for Glamorgan 110 and for Monmouthshire 104. Apart from Anglesey (109), Breconshire (108) and Merionethshire (107), all the other Welsh counties and county boroughs show lower ratios, and the ratios for the three county boroughs of Cardiff, Newport and Swansea are not above 89 to 91. The statistics are set out in detail in Appendix XV.

Excess Puerperal Mortality in the Special Areas.

The high and increasing puerperal death-rate in the Special Areas of Wales is shown in the following Table (rates per 1,000 live births):—

	1924-8.	1929-33.
<i>Wales—</i>		
Special Areas	... ... 5.16	6.50
Other Areas	... ... 5.48	5.41
All Areas	... ... 5.34	5.85
<i>England (All Areas)</i>	... ... 4.02	4.20

During the period 1924-8 the puerperal death-rate was lower in the Special Areas than in the rest of Wales. The rate in the Special Areas, however, has since 1928 increased substantially,

while for the other areas in the aggregate it has remained practically stationary. For 1929-33 the puerperal mortality rate in the Special Areas was 54.8 per cent. above the rate for England, and for the rest of Wales the percentage excess was 28.8.

The puerperal death-rates for Glamorgan, Monmouthshire and the county boroughs are given in the following Table. The rates are per 1,000 live births and the numbers in brackets denote the numbers of deaths on which the calculations are based.

	<i>Special Areas.</i>		<i>Other Areas.</i>	
	1924-8.	1929-33.	1924-8.	1929-33.
<i>Administrative Counties.</i>				
Glamorgan*	5.40 (368)	6.54 (339)	5.95 (96) 5.32 (70)
Monmouth	4.41 (144)	6.51 (173)	4.02 (18) 3.96 (15)
<i>County Boroughs.</i>				
Merthyr Tydfil	6.18 (46)	5.37 (30)	— —
Cardiff, Newport and Swansea	—	—	5.06 (240)	4.65 (187)

* Detailed statistics for each urban and rural district in Glamorgan are given in Appendix XII. The county districts of Monmouthshire are smaller than those of Glamorgan and a similar Table for this county is not given. The Special Areas of Monmouthshire are the areas grouped as "Industrial" (except Newport County Borough) in Appendix II.

It will be seen that the death-rate has increased in the Special Areas both of Glamorgan and Monmouthshire and has decreased in the non-Special Areas of these counties. In Merthyr Tydfil, as in the other county boroughs, the puerperal death-rate decreased between 1924-8 and 1929-33.

The number of deaths in the non-Special Areas of Monmouthshire and in Merthyr Tydfil is not large, and even the number in the non-Special Areas of Glamorgan (96 deaths in 1924-8 and 70 deaths in 1929-33) is not sufficiently large to exclude the element of chance in any conclusions suggested; but the death-rates for the Special Areas of Glamorgan and Monmouthshire are based on a considerable number of deaths, and the evidence is strong that there has been a significant increase in the puerperal death-rate in these areas. While it may be inferred that in the non-Special Areas of these counties, taken in the aggregate, the death-rate has shown no tendency to increase and is below that of the Special Areas, the statistical data here are not sufficiently extensive to justify firm conclusions.

The most interesting feature of the statistics is the contrast presented in the rates for the two classes of area in Glamorgan and Monmouthshire. The rates are high both for the Special Areas and the non-Special Areas of Glamorgan, but for the non-Special Areas of Monmouthshire low rates are shown (based,

as already pointed out, on a small number of deaths) which approximate very closely to those for England. These differences may possibly be accounted for in part by differences in the economic conditions in the respective areas. Most of Glamorgan is industrial in character, but Monmouthshire falls into two fairly well defined regions, an industrial region in the west and an agricultural region in the east. The agricultural region, abutting on England, is a fertile area similar in character to the adjoining rural districts of Herefordshire and Gloucestershire.

The Separate Causes of Puerperal Death.

The puerperal death-rates for the Special Areas and the rest of Wales are analysed according to separate cause of death in the following Table. The rates are per 1,000 live births and the numbers in brackets denote the numbers of deaths on which the calculations are based.

Cause of Death and Group No.	Special Areas.		Other Areas.	
	1924-8.	1929-33.	1924-8.	1929-33.
Abortion	0.88 (140, 141)	0.96 (97)	0.55 (82)	0.60 (75)
Sepsis	1.05 (145)	1.53 (116)	1.56 (131)	1.43 (231)
Haemorrhages ...	0.80 (142, 144)	0.86 (88)	0.79 (74)	0.69 (117)
Toxaemias ...	1.41 (146, 147)	1.78 (156)	1.42 (152)	1.41 (211)
Other Causes ...	1.02 (143, 148-150)	1.37 (112)	1.15 (117)	1.28 (171)
All Causes	5.16 (140-150)	6.50 (569)	5.48 (556)	5.41 (812)
				(679)

In 1924-8 there was little difference in the rates for the two classes of area, except for abortion and sepsis. The abortion death-rate was much higher, and the sepsis death-rate much lower, in the Special Areas. The rates for 1929-33, however, show an excess mortality in the Special Areas compared with the rest of Wales under each cause of death. Between the two periods there was little variation in the rates in the non-Special Areas, but an increased death-rate under each heading in the Special Areas. The largest increase occurred under sepsis.

It is believed that procured abortion has become much more common in recent years in industrial South Wales. This subject is discussed at length in the chapter on "Abortion" (page 68).

The Maternity Services.

The maternity services provided by the Local Authorities in industrial South Wales are reasonably comprehensive and have been developed in recent years. The standard of service in the Special Areas is probably, on the whole, superior to that in the other industrial parts of South Wales, apart from the county boroughs. Women in necessitous circumstances more readily avail themselves of the public provision offered than women in better circumstances, and the greater need in the Special Areas has no doubt been an incentive to the Local Authorities to develop their maternity services as much as possible within the limits of local finance. The services provided are within easy reach of the women, and are fully utilised. The nature and extent of the various services are described in the chapter on "The Maternity Services" (page 27).

In all the Special Areas milk is given free or at cost price at the clinics. Few of the Authorities provide any iron preparations to expectant mothers, and there is evidence that a large number of expectant mothers suffer from anaemia. It is desirable that iron and possibly calcium should be more freely prescribed at centres.

There is no insufficiency in the number of midwives practising in the Special Areas. In Glamorgan practically all the Authorities pay the fee of the midwife in necessitous cases, but the Monmouthshire County Council have not undertaken to pay the fee in such cases. The services of a consultant are available in all areas for cases of difficult labour, and are paid for by the Authority. They are, however, not used to any extent except in the Rhondda, where by arrangement the fee is paid by the National Birthday Trust.

Dental treatment for expectant and nursing mothers is provided in all the Special Areas. Institutional provision is mainly of the poor law type, both in Glamorgan and Monmouthshire. Two Authorities in Glamorgan provide separate maternity accommodation with an aggregate of 20 beds, and the Monmouthshire County Council subsidise a voluntary institution containing seven beds. A total of 1,755 women were admitted to institutions in Glamorgan and 210 in Monmouthshire during 1935.

General Observations.

It is recognised that high death-rates can be associated with industrial conditions, for high rates were recorded in South Wales even in the days of prosperity. Since the coming of industrial depression, however, it is to be noted that the puerperal mortality rate has increased considerably in those industrial districts scheduled as Special Areas, whereas for most

parts of Wales the death-rate has remained more or less stationary. In Merthyr Tydfil, where unemployment has been particularly severe, the puerperal death-rate, contrary to the general tendency in the Special Areas, has fallen; the number of puerperal deaths, however, is too small for the death-rates to have great statistical significance.

The investigations made in the course of this inquiry have furnished grounds for the belief that there has been an increase in sickness and ill-health among the mothers in the industrial areas of South Wales. The influence exerted by poor nutrition in producing maternal mortality cannot be accurately estimated; this question is discussed on the next page. Abortion seems likely to have played some part in the increased maternal risk. Another factor which must not be overlooked is that in recent years there has been extensive migration from the Special Areas, and many of the women migrants are young and healthy persons of childbearing age. The excess puerperal mortality in the Special Areas may be the cumulative result of a variety of unfavourable factors working in association. Fuller information based on inquiries covering a longer period and with comparative statistics for other areas similarly circumstanced would be necessary before a true estimation of the significance of the data collected for the purpose of these investigations could be formed.

It must be remembered that the problem of the Special Areas is relatively a greater one in Wales than in England; the areas are more compact and the difficulties are more concentrated. The compensatory influences of good services and facilities are not so much in evidence in Wales as they are stated to be in England.

NUTRITION, WATER SUPPLY AND METEOROLOGY.

Nutrition.

The information obtained regarding the nutrition of expectant and nursing mothers was mainly of a general character. It was not possible to make an exact study of the subject, as the extent to which malnutrition may exist in a community cannot easily be determined. To obtain the necessary data would entail the analysis and assay of the total food intake of a representative sample of the population, together with clinical examinations. Again, assuming that the evidence of malnutrition were established, the further question would then arise of assessing the effect of under-nourishment on maternal risk.

The inquiries revealed differences of opinion as to the influence of malnutrition on maternal mortality. The examination of the case papers of maternal deaths afforded no reliable information, as particulars under this heading were usually inconclusive. This result is not surprising, in the absence of any accepted clinical standards, for the assessment of the state of nutrition must be largely a personal matter.

All these considerations must enter into an examination of the question of food in relation to maternity, and these observations are intended merely to indicate lines for further investigation.

It must be remembered that when people are living under depressed economic circumstances it is difficult to relate to one factor alone, such as poor nutrition, effects which may be due to a variety of unfavourable factors working in association.

From an examination of 187 women made at 10 ante-natal clinics in South Wales recently it was considered that 80 per cent. were in reasonably good condition and 20 per cent. in poor condition. It can be expected, however, that a certain proportion of women attending an ante-natal clinic will always show the stress of their condition, while others may be subject to definite physical disability, such as renal or cardiac disease, and this final average is not, therefore, unduly disturbing.

Of 665 mothers of young children seen at 17 infant welfare centres in South Wales, however, 30 per cent. were regarded as in definitely poor condition. This condition was manifest in a general listlessness, in apathy, by an appearance of age beyond the actual years, occasionally by some degree of emaciation, but more especially by anaemia, which in some cases was severe. The figure of 30 per cent. is without doubt unduly high for an average working class district, for although some of these cases were not due to malnutrition in the sense of faulty or insufficient diet but to a sufficient pathological cause, most of them had no obvious pathological condition.

In some parts of Wales, particularly in the industrial areas, the Local Authorities distribute large quantities of milk to expectant and nursing mothers in order to supplement their diets during pregnancy and the puerperium.

In rural Wales the standard of living is on the whole low. Comparatively little farm produce finds its way to the home table. Eggs, milk and butter are produced for sale outside the area, and the staple articles of diet are bacon, broth, tea and bread and butter. Among large sections of the population there is insufficient intake of the natural protective foods and of first class proteins. It appears also that the dietary is deficient in calcium, iron, phosphorus and iodine.

Anaemia of the hypochromic type was said to be prevalent, especially in the rural districts, and in a large number of the investigated deaths mention was made of a diagnosable degree of anaemia. There was little evidence of the results or sequelae of rickets among the women.

The intake of salt in the diet of the rural population is very high and it has been suggested that this might be an etiological factor in the production of the toxæmias.

Although some of the practitioners from whom inquiries were made maintained that malnutrition had exerted no influence in increasing maternal risk, it is difficult to believe that under-nourishment and poor feeding are not without effect upon the general health of the mothers, and it is suggested elsewhere that an excess of ill-health among expectant mothers increases the risks at childbirth. No simple relationship between nutrition and maternal mortality can, however, be expressed.

Water Supply.

Most of the public water supplies in Wales are derived from upland surface sources of soft water. Most of the private supplies from wells and springs are also from waters of a low degree of hardness.

The population supplied with hard or moderately hard water is limited to the comparatively small populations obtaining water from the carboniferous limestone outcrops bordering the South Wales coalfield and the small limestone areas in the counties of Pembroke, Denbigh and Flint.

It has been suggested that the distribution of minute quantities of lead in a plumbo-solvent water might be an important factor in the causation of the high mortality rates—and particularly the toxæmia rates—in some of the Welsh counties. As regards certain of the rural counties, lead poisoning by cumulative small doses cannot be an important factor, for the population obtaining a piped supply is a comparatively small one and equally high mortality rates are exhibited in rural districts dependent upon unpiped supplies from wells and springs.

Again no distinction of any significance can be made between mortality rates in those few districts in industrial Wales which receive a piped supply of hard water and the mortality rates of neighbouring areas supplied by soft water.

An attempt of this kind to establish a relationship between an isolated factor such as water supply without having regard to other factors would most probably in any case give an inconclusive result. Furthermore the hard water areas are so limited in size that no correlation of statistical significance could be established. It would appear that the most likely field for inquiries of this nature, such as the action of various constituents of water and diet or the result of the absence of any constituents, is limited to clinical and pathological observations.

Climatic Conditions and Seasonal Variations.

Seasonal variations in meteorological conditions exert some influence upon the incidence of puerperal mortality.

A comparison of mortality rates for districts of varying climatic characteristics cannot very well be made for Wales. The present studies were based on few meteorological observations, particularly in the coastal districts, and the conditions inland were found to vary considerably. For instance, the rainfall of a station 10 or 20 miles from the sea is often double that at the sea level, and the contours of the country are so irregular as to make it difficult to select suitable districts for comparison.

From the meteorological data available, it appears that the central hilly districts are the wettest and have the least sunshine. The climate is warmest in the south and west coastal districts. As might be expected, the areas having the most inclement conditions are the hilly, inaccessible areas, where the population is sparse and the standard of living poor. Puerperal deaths in these areas would naturally be few, even though in proportion to births the mortality might be high, and detailed statistical investigation into a possible relationship between excessive puerperal mortality and adverse climatic conditions would scarcely be likely to yield results of any value. The puerperal mortality rates are high throughout Wales and the most that could be shown is whether the rates are preponderantly high in the wettest and coldest regions. But even assuming that on the small number of puerperal deaths in these upland regions excess mortality was shown, it would be difficult to assess the influence of meteorology as distinct from such other factors as inaccessibility of medical facilities and diet of the people in contributing to that excess. It may be said, however, that the puerperal mortality rates for the individual Welsh counties do not show that there is any great excess of mortality in the exposed and

mountainous western counties over the mortality in the more sheltered and fertile eastern counties abutting on the English border.

An examination has been made of the seasonal variations in puerperal mortality. Mortality rates for all causes are lower in the summer than in the winter months. Puerperal mortality rates show the same trend, but the seasonal variations are not so great, the variations being more pronounced in the case of puerperal sepsis than for causes other than sepsis.

The following Table shows the ratio of quarterly death-rates to the yearly rate taken as 100. For all causes, death-rate ratios are given for England and Wales, as separate figures for Wales are not available.

	Jan.- Mar.	Apr.- June.	July- Sept.	Oct.- Dec.
All Causes, England and Wales, 1926-30	131	95	78	96
Puerperal Mortality, Wales,* 1924-33, (ratios on a death- rate per 1,000 births)				
Post-abortive and Puer- peral Sepsis* ...	108	98	76	121
Other Puerperal Causes* ...	103	87	103	108

The death-rate from all causes is much higher in the January-March quarter than in any other quarter, but for puerperal causes the rates are highest in the October-December quarter.

In the following Table the maternal deaths investigated by Medical Officers of Health during 1929-34 are classed according to the quarter of occurrence:—

	Jan.- Mar.	Apr.- June.	July- Sept.	Oct.- Dec.	Total.
Maternal Deaths ...	294	250	251	284	1,079
Number with pre- existing disease ...	118 (40.1 per cent.)	82 (32.8 per cent.)	104 (41.4 per cent.)	111 (39.1 per cent.)	415 (38.5 per cent.)

The percentage of deaths where the woman was suffering from a non-puerperal disease is lowest in the April-June quarter (32.8 per cent.); for the other three quarters the percentages are between 39 and 41 per cent., suggesting no large differences. Meteorological conditions would seem to be most favourable to childbirth in the April-June quarter, which is the period showing the lowest death-rate in 1924-33 from puerperal causes other than sepsis. It will be observed that the death-rate from all causes, 1926-30, was lowest in the months of July-September.

* The numbers of deaths on which the puerperal mortality rates were calculated are—

Post-abortive and Puerperal				
Sepsis ...	228	218	164	239
Other Puerperal Causes ...	454	404	464	445

IX.

ARRANGEMENTS DURING PREGNANCY AND AT BIRTH.

Ante-Natal Care.

Information was available, from the case histories of the 1,079 investigated deaths, of the extent to which ante-natal care was provided in these cases.

It was found that in 34 per cent. of the deaths no attention of any kind was given during pregnancy. The percentages are practically the same for both the Welsh regions.

	<i>Wales I.</i>	<i>Wales II.</i>	<i>Wales.</i>
Ante-natal			
care given ...	568 (66 per cent.)	142 (67 per cent.)	710 (66 per cent.)
No ante-natal			
care given ...	299 (34 per cent.)	70 (33 per cent.)	369 (34 per cent.)
Total deaths ...	867 (100 per cent.)	212 (100 per cent.)	1,079 (100 per cent.)
	—	—	—

Of these 1,079 deaths, 908 occurred after, and 171 before, the twenty-eighth week of pregnancy. It was found that of the 908 deaths after the twenty-eighth week of pregnancy 655, or 72 per cent., had received some kind of ante-natal care, whereas of the other 171 cases only 55, or 32 per cent., had received ante-natal care. The figures thus suggest that pre-natal attention is in many cases only taken advantage of late in pregnancy.

The regional grouping of the 908 deaths is shown in the following Table:—

	<i>Wales I.</i>	<i>Wales II.</i>	<i>Wales.</i>
Ante-natal			
care given ...	520 (72 per cent.)	135 (72 per cent.)	655 (72 per cent.)
No ante-natal			
care given ...	201 (28 per cent.)	52 (28 per cent.)	253 (28 per cent.)
Total deaths ...	721 (100 per cent.)	187 (100 per cent.)	908 (100 per cent.)
	—	—	—

An analysis of the deaths into the various causes (see Table below) shows that absence of care during pregnancy was most frequent in cases of abortion. This is to be expected, since all these deaths occurred before the twenty-eighth week of pregnancy, and most of them much earlier.

Of the other death causes, there is little difference in the percentage variations.

Cause of Death.*	No. of Investigated Deaths.	No. of Deaths where no ante-natal care was given.	Percentage to total Deaths.	
			Per cent.	Per cent.
Abortion	... 115	90	78	
Sepsis	... 307	85	28	
Toxaemias	... 200	59	30	
Trauma	... 169	44	26	
Haemorrhages	... 150	53	35	
Intercurrent Disease	... 138	38	28	
All Maternal Deaths	1,079	369	34	

* Classification of the cause of death has been made after scrutiny of the case papers of the investigated deaths.

A grouping of the investigated deaths according to the age of the mother and the parity position of the child shows that there was relatively less ante-natal care given to the women over age 40 and to those who had already borne one child. The figures are:—

Deaths in Age Groups.

Age Group.	No. of Investigated Deaths.	No. of Deaths where no ante-natal care was given.	Percentage to total Deaths.	
			Per cent.	Per cent.
All Ages	1,079	369	34.2	
15- ...	195	72	36.9	
25- ...	272	91	33.4	
30- ...	252	77	30.6	
35- ...	257	86	33.5	
40+ ...	103	43	41.8	

Deaths according to Parity.

No. of Pregnancy.	No. of Investigated Deaths.	No. of Deaths where no ante-natal care was given.	Percentage to total Deaths.	
			Per cent.	Per cent.
1st Pregnancy	433	115	26.6	
2nd „	195	75	38.5	
3rd „	127	52	40.9	
4th „	90	36	40.0	
5th „	70	26	37.1	
6th „	49	18	36.7	
7th „	34	13	38.2	
8th „	27	10	37.0	
9th and above	54	24	44.4	

In the preceding Tables the investigated deaths have been classed only according to whether ante-natal care was or was not received by the patient, and so far the analyses take no account of the extent or efficacy of such care. It was clear throughout the investigations that it was not enough to know whether or not the woman had received ante-natal care but that inquiry should be directed also to the nature of that care, both in extent and quality.

It was difficult to take any criterion, but in a certain proportion of the cases it appeared that if the patient had received proper and sufficient ante-natal attention the probability was that she would not have died. Every death was examined with this standard in mind, and the opinion was formed that in 212 of the 1,079 deaths (i.e. 19.6 per cent.) the death might have been prevented with reasonable care and attention during pregnancy. This means, in effect, that if this sample of deaths is representative (as it is believed to be), then if every woman received careful ante-natal supervision at all stages of pregnancy the present high mortality rates for Wales could be substantially reduced.

It was found that in 126 (or 59 per cent.) of the 212 deaths the woman had received some kind of ante-natal care, and that in the other 86 cases (41 per cent.) no ante-natal care of any kind was given. The figures for the two Welsh regions are:—

		Wales I.	Wales II.	Wales.
Total Maternal Deaths	... ...	867	212	1,079
Deaths considered preventable—				
(a) No ante-natal care given	...	61	25	86
(b) Inadequate ante-natal care given	... ...	101	25	126
Total of (a) and (b)	... ...	162	50	212
		(19 per cent.)	(24 per cent.)	(20 per cent.)

It is evident that if ante-natal care is to be really effective in reducing the risks at childbirth the care given must be thorough and systematic, with full opportunity for expert advice as soon as any untoward symptoms are brought to notice. In many of the above cases, notwithstanding some form of ante-natal supervision, symptoms which might have suggested an unfavourable prognosis remained undetected.

It is pointed out in the next section dealing with the mother's own responsibility during pregnancy that in 93 of the 212 cases the failure of the patient to receive sufficient ante-natal care was due to ignorance or neglect on her part.

Conclusions:—

- (1) In a large proportion of the deaths (34 per cent.) the patient received no ante-natal care.

(2) In many cases ante-natal care was given too late in pregnancy to be of full preventive value.

(3) It is possible that as many as one-fifth of the investigated deaths (212) might have been prevented if adequate ante-natal care had been given. Of these 212 deaths, in 86 cases the woman received no ante-natal care and in the remaining 126 cases some care was given.

(4) In a large proportion of the deaths considered preventable there was neglect by the mother herself to take reasonable measures for the safe conduct of the pregnancy.

The Mother's Responsibility.

Examination of the records of the investigated maternal deaths suggested that in a considerable number of the cases ignorance or neglect or an error on the part of the patient had contributed to the death. In 14 of the deaths there was evidence of procured abortion, and all these 14 deaths occurred in Wales I, i.e. in districts mainly industrial.

The following figures are based upon a scrutiny of the records of the investigated maternal deaths:—

	<i>Wales I.</i>	<i>Wales II.</i>	<i>Wales.</i>
Total Maternal Deaths	... 867 (100 per cent.)	212 (100 per cent.)	1,079 (100 per cent.)
Cases where some ignorance, negligence, or error by the patient was considered to have led to death:—			
(a) insufficiency of care during pregnancy ...	65 (7.5 per cent.)	28 (13.2 per cent.)	93 (8.6 per cent.)
(b) other forms of negligence, &c. ...	83 (9.6 per cent.)	19 (9.0 per cent.)	102 (9.5 per cent.)
Total of (a) and (b) ...	148 (17.1 per cent.)	47 (22.2 per cent.)	195 (18.1 per cent.)

In all these cases the lack of care during pregnancy or at confinement was due to neglect on the part of the patient herself. The importance of ante-natal care is only slowly being realised, especially in rural areas, and in a number of cases the women do not take reasonable steps during the ante-natal period, e.g. consulting a doctor, or possibly not continuing under care after engaging a doctor or nurse. The figures in (a) of the above Table show a larger percentage for Wales II than Wales I. It needs to be stressed that the initiative for the ante-natal care must, from the nature of the circumstances, come from the woman herself. The doctor, nurse, or the Authorities through their clinics and health visitors, cannot attend a woman until she has informed them of her pregnancy and has consented

to be examined. Furthermore, she should obey implicitly the suggestions made for her welfare by her attendants and should continue under their care throughout the pregnancy.

The figures in (b) of the Table above show that in nearly 10 per cent. of the deaths serious neglect by the woman or her friends at the time of labour contributed to death. Instances of cases coming within this category were: failure to call in a nurse or doctor in labour; the absence of proper facilities for childbirth which could have been provided; refusal to accept treatment; and refusal to enter hospital.

The Table shows that there were more cases where the neglect or error of the patient herself occurred at the time of birth or afterwards than during pregnancy. It would surely be expected that the possible consequences of neglect at the time of confinement would be apparent to every woman, yet cases were found in which the patient either would not or could not see the necessity for taking even simple precautions. Unfortunately in this group were found many cases where the friends or relatives were equally or to a greater extent responsible, and however well intentioned may have been the persons connected with the patient, in some cases their advice or delay had the most serious consequences.

For the purpose of analysis each of the above cases was classed under one of the two headings (a) insufficiency of care during pregnancy; (b) other forms of negligence; but in many cases there was negligence under both headings. In such instances the case has been classified under the heading which appeared to have the greater weight in contributing to the death.

It is considered that all the 195 deaths shown in the Table might not have occurred if due care had been taken by the patient, her friends or her relatives. However efficient may be the services provided for maternal care, they will not be effective if the mother herself does not co-operate. There is clearly a great need for improved education in matters concerning maternal care, but success in spreading knowledge of care and personal hygiene during pregnancy is most likely to be attained if the work is entrusted to doctors and nurses through personal contacts. The arrangements for seeing the patient will vary according to circumstances; in some cases the personal contact of her own doctor and nurse will be more effective and in other cases the services of the antenatal clinics will be the better means of influencing the patient.

Place of Delivery.

The description already given of conditions in Wales and of the standard of the maternity services will have indicated that a large number of births occur in surroundings which are

unsuitable for delivery. A home which is suitable for a normal confinement may be unsuitable where operative interference is necessary.

The following statistics relate to maternal deaths investigated in Wales during 1929-34, and to deaths which were the subject of inquiry by the Ministry of Health during 1933-4 (see Annual Reports of the Chief Medical Officer of the Ministry of Health on the State of the Public Health):—

Place of Confinement.	Wales I.	Wales II.	Wales.	Ministry of Health Inquiries, 1933 and 1934, England and Wales.
Hospital	233 (26.9 per cent.)	52 (24.4 per cent.)	285 (26.4 per cent.)	1,532 (44.3 per cent.)
At home (including ambulance)	558 (64.3 per cent.)	137 (64.8 per cent.)	695 (64.4 per cent.)	1,596 (46.2 per cent.)
(Undelivered)	76 (8.7 per cent.)	23 (10.8 per cent.)	99 (9.1 per cent.)	319 (9.2 per cent.)
Not stated	—	—	—	9 (0.3 per cent.)
Totals	867 (100 per cent.)	212 (100 per cent.)	1,079 (100 per cent.)	3,456 (100 per cent.)

Place of Death.	Wales I.	Wales II.	Wales.	England and Wales.
Hospital*	395 (45.6 per cent.)	88 (41.3 per cent.)	483 (44.7 per cent.)	2,607 (75.5 per cent.)
At home (or in ambulance) ...	472 (54.4 per cent.)	124 (58.7 per cent.)	596 (55.3 per cent.)	841 (24.3 per cent.)
Not stated	—	—	—	8 (0.2 per cent.).
Totals	867 (100 per cent.)	212 (100 per cent.)	1,079 (100 per cent.)	3,456 (100 per cent.)

* These deaths comprise those where confinement took place in hospital (see first Table above), plus deaths where the woman was confined at home and subsequently transferred to hospital. The term "hospital" includes institutions and maternity homes.

The Table indicates that much greater provision has been made in England than in Wales for cases of pregnancy needing hospital treatment. Statistics published by the Registrar-General for 1932 relating to live births in institutions show that for England and Wales 24 per cent. of the births occurred in institutions, compared with 8.2 per cent. for Wales. The percentages in more detail are:—

	England and Wales.	Wales	Wales I.	Wales II.
<i>In Public Assistance Institutions—</i>				
Legitimate births ...	6.3	1.2	1.4	0.8
Illegitimate „ ...	24.3	14.1	17.3	7.8
<i>In Hospitals, Nursing Homes and Maternity Homes—</i>				
Legitimate births ...	16.8	6.5	6.5	6.7
Illegitimate „ ...	17.1	5.9	6.8	4.0

The smaller proportion of hospital cases in Wales is due to two causes: (1) the paucity of beds in well equipped institutions, and (2) the reluctance of patients to make use of the beds that are available. The term "available" is used advisedly, as although maternity beds are provided by a number of Authorities, many of the beds are in poor law institutions of unsatisfactory type and surroundings. In the section of this report on "Institutional Provision" (page 37) this subject is more fully discussed; but it may be mentioned here that the absence of properly equipped homes and wards in Wales adds to the difficulty of providing those facilities which are necessary in the complicated and dangerous case.

The Attendant at Delivery.

In this section the statistics relating to births in 1934 and the investigated maternal deaths in 1929-34 are examined according to whether the attendant on the mother was a doctor or a nurse. The term "maternity case" is used where a doctor has been engaged and accepts responsibility for the case and the midwife acts in the capacity of a maternity nurse as defined in the rules of the Central Midwives Board. A "midwifery case" is a case where a midwife has accepted responsibility for attendance on a patient in her confinement. As midwife she is required to summon a doctor in case of emergency, and the doctor is sometimes sent for at the request of the relatives.

Of 33,447 domiciliary cases during 1934 of which records were available from the midwives' registers 6,033, or 18.0 per cent., were maternity cases. Of the maternal deaths investigated by Medical Officers of Health during 1929-34, however, 38.6 per cent. of the deaths which occurred in the home were maternity cases. The following are the detailed figures:—

	<i>Births, 1934 (Midwives' Records).</i>	<i>28th week of pregnancy and after.</i>	<i>Investigated Deaths, 1929-34:</i>
Maternity case with doctor present	5,603		208
Maternity case with no doctor present	430	6,033 (18.0 per cent.)	219 (38.6 per cent.)
Midwifery case with doctor	7,649		218
Midwifery case with no doctor	19,765	27,414 (82.0 per cent.)	348 (61.4 per cent.)
Total domiciliary cases ...	33,447	(100 per cent.)	567 (100 per cent.)

The figures suggest that the puerperal mortality rate is much higher for the maternity than the midwifery cases, but it should be borne in mind that maternity cases contain a larger proportion of primiparous births and of women who had trouble

during pregnancy or at a previous confinement. As a rule a doctor is engaged only where the woman is able to afford his services or where symptoms are present or difficulty is anticipated. In 20,195 of the 33,447 births no doctor was in attendance at the birth.

The following Table shows the maternal death-rate, the death-rate for young infants, and the stillbirth frequency among the cases attended by midwives in 1934:—

Type of Case.	Total Cases. Live and Stillbirths.	Maternal Deaths.		Stillbirths.		Deaths of Infants within 10 days of Birth.	
		No.	Death-rate per 1,000 total Births.	No.	Death-rate per 1,000 total Births.	No.	Death-rate per 1,000 total Births.
Maternity ...	6,033	30	4.97	411	68	184	33
Midwifery ...	27,414	75	2.74	1,148	42	529	20
Hospital	2,535	22	8.68	172	68	90	38
Total	35,982*	127	3.53	1,731	48	803	23

* There were in Wales 6 cases of which particulars were not available.

Again the rates are higher for maternity than midwifery cases. The highest rates are shown for hospital cases, but most of these were cases presenting some abnormality.

X.

MIDWIFERY PRACTICE AND TECHNIQUE.

Midwifery Practice of General Practitioners.

In considering the problems relating to maternal mortality in Wales, the standard of obstetric skill of the practitioners and their experience in recognising and dealing with conditions arising out of or associated with pregnancy must be taken into account.

Skill and experience come with practice, but the opportunities for obtaining experience have become less in Wales because the number of cases dealt with by doctors has diminished. The reasons are largely (1) the progressive decrease in the number of births (see page 11), and (2) the increase in the number of cases dealt with solely by midwives.

Decline in Number of Cases attended by Practitioners.

It has not been possible to obtain accurate information as to the number of cases attended by each doctor in particular areas in Wales. If, however, the total number of cases attended by practitioners in 1934 had been equally divided among the doctors engaged in National Health Insurance practice, each practitioner would have attended about 17 cases during the year. This is the nearest computation that can be made, and since many doctors attend more than 17 cases a year, a large number must attend less than this average number of cases. It was found, for example, that in one county the average number of cases seen by the doctor ranged about three during the years 1924-33. Twenty or thirty years ago, it was not uncommon for a doctor to attend 100 confinements or more in a year. Now normal cases are delivered mostly by midwives and the doctor attends only when difficulty is anticipated or occurs. The result is that the doctor not infrequently lacks the background of straightforward cases with which to compare the abnormal case.

The lessening experience and familiarity of most practitioners with midwifery practice has tended to allow the judgment and skill required for abnormal cases to pass more into the hands of those practitioners who have an opportunity for frequent consultations. Generally this class will include the practitioner who has a large midwifery practice, the doctor who works on the staff of a hospital into which maternity cases are admitted, and the doctor who works in conjunction with one or more other practitioners and consequently has the opportunity of seeing their cases as well as his own.

This question has been discussed with a large number of practitioners during interviews, and many have admitted that

midwifery forms a small part and the least attractive part of their practice. Many also stated that they would not consider it a hardship if they ceased to be concerned with midwifery.

In the course of this inquiry it was obvious that the general practitioner was entitled to sympathy. He often has to do his obstetric work under difficult conditions and with few facilities. One hesitates to take up an attitude of criticism when circumstances surrounding midwifery are so inhibitive of good work. The difficulties were discussed with a large number of practitioners and the suggestions made for improving the conditions of work in domiciliary practice resolve themselves under two heads:—

(a) That all domiciliary cases should be attended only by those practitioners who have particular interest and experience in midwifery work.

(b) That facilities should be given to every practitioner to aid him in difficulty and to relieve him of responsibilities that he may not be in a position to face. Thus he should have the opportunity to call in a colleague in ordinary cases, and a specialist in cases of complicated labour.

There should also be adequate provision of hospital beds for complicated cases and cases where the home circumstances are not favourable. The doctor should be given every opportunity for observing the conduct of the case by the specialist in charge.

Ante-natal Care by Practitioners.

It has been maintained that it is largely the attitude of the general practitioner towards ante-natal work that has forced public health authorities to provide ante-natal clinics, and that the practitioner has concentrated too much on the medical rather than on the educational aspect of the problem. This inquiry tends to confirm the statement. It was found that it was the exception rather than the rule for a patient to be examined ante-natally by the doctor except when some abnormality had been detected by the patient or the nurse and the case had been referred to the doctor. A fairly high proportion of the cases that died had been seen by doctors (see next page), but presumably in many of these cases the patient had developed some abnormality.

Ante-natal clinics are generally staffed by whole-time officers of the Maternity and Child Welfare Authority, but a few, in some country districts, are run by general practitioners who are also responsible for the infant welfare clinics.

For convenience the type of examination can be divided into two:—

(a) examinations which are within the scope of a general practitioner's experience; and

(b) examinations which require a degree of skill which only an expert possesses.

In the first group can be placed the examination of urine, the taking of blood pressure, the survey of increase of weight of the patient, the recognition of obvious objective symptoms, such as oedema, headache, warning haemorrhages; and the recognition of gross degrees of malpresentations and disproportion of the foetal head and the pelvis. In the second group can be classed the recognition of some cases of early toxæmia and of concomitant disease with pregnancy, and of some malpresentations and of fine degrees of disproportion between the foetal head and the pelvis. It is presumed, therefore, that cases in the first group can ordinarily be undertaken by the general practitioner and in some instances by well-trained nurses; but cases in the second group should come under the aegis of the expert although not necessarily the consultant. It may be stated, therefore, that while some cases can be easily undertaken in examination by the general practitioner, there should be facilities for further reference where necessary either to a consultative clinic or to a consultant.

It has been ascertained that while in most cases the patient receives some kind of ante-natal care, generally by the midwife, that care does not go far enough, and it is shown (page 99) that death in many cases might possibly not have occurred had proper attention been given before birth. There is not that close co-operation which should exist between doctor and nurse or doctor and clinic. Thus an analysis of the investigated deaths (see page 97) showed no mention at all of care during pregnancy in 28 per cent. of the cases in which death occurred within twelve weeks of term (i.e. cases which had definitely reached the stage for ante-natal care). Further, no ante-natal care was given in 34 per cent. of all the deaths. Out of a sample of 977 investigated deaths it was found that the doctor had been consulted and had seen (but not necessarily examined) the patient in 486 cases.

The numbers in Wales I were 375 cases (48.9 per cent.) out of 767 deaths, and in Wales II, 111 cases (52.8 per cent.) out of 210 deaths. Of these 977 deaths, 140 (18.2 per cent.) of the patients in Wales I and 15 (7.1 per cent.) in Wales II had attended an ante-natal clinic.

Interference.

Analysis of the Statistics of Births and Investigated Deaths.

From information collected from the Midwives' Registers for the year 1934, relating to 35,249 births in Wales occurring at or after the 28th week of pregnancy, it has been ascertained

that there was some manipulative interference by the doctors in approximately 14 per cent. of the confinements.

The rate was higher in rural Wales than in industrial Wales, being 16 per cent. in region Wales II, compared with 12 per cent. in region Wales I. These are high rates of interference.

In 23 per cent. of the births under review some form of complication was stated to be present, the commonest condition being delayed labour. Interference occurred in 36 per cent. of the complicated cases and in 7.7 per cent. of the uncomplicated cases.

The first Table given below shows the proportion of cases in which interference occurred among the 26,977 uncomplicated births and among the 8,272 births with complications. It also shows the interference rate for maternity cases, midwifery cases and hospital cases separately (for definition of the terms "maternity" and "midwifery" see page 103).

Type of Case.	Births without Complications.			Births with Complications.		
	No. of Births.	Manipulative Interference.		No. of Births.	Manipulative Interference.	
		No. of cases.	Percentage of total Births.		No. of cases.	Percentage of total Births.
Maternity	3,874	1,208	31.2	1,988	1,027	51.7
Midwifery	21,554	702	3.3	5,368	1,590	29.6
Hospital*	1,549	161	10.4	916	358	39.1
Total	26,977	2,071	7.7	8,272	2,975	36.0

* The term "hospital" includes nursing homes and maternity homes.

The following Table shows the proportion of cases in which interference occurred among the 908 mothers who died during 1929-34, whose deaths were investigated by Medical Officers of Health. The pregnancy in each of the cases had extended to at least 28 weeks. The cases have been arranged in similar groups to those in the Table above.

Type of Case.	No. of Investigated Deaths.	Manipulative Interference.	
		No. of cases in which Interference occurred.	Interference Rate.
Maternity	219	135	61.6
Midwifery	348	153	44.0
No Nurse	62	9	14.5
Hospital...	279	180	64.5
Total	908	477	52.5

The reports showed that in 756 of the 908 cases, complications of pregnancy or labour existed. In 152 instances, however, no indication was obtained from the reports that any complication had arisen before or during labour.

Interference took place in 52.5 per cent. of the total cases in this series (in 59.1 per cent. of the complicated cases and in 19.7 per cent. of the uncomplicated cases). The fact that 279 of the 908 deaths occurred in hospital suggests that a large proportion were difficult cases, and it is probable, also, that the complications were generally of a more serious nature among the maternity than the midwifery cases. It will be noted that as regards the series of births (the first Table above) the great majority of the cases were midwifery cases in which no complications were present.

Summarised, the percentages of cases with interference among the births (the first Table above) and the investigated deaths (the second Table above), with and without complications during pregnancy or at labour, are:—

	<i>Cases where Interference occurred.</i>	
	<i>Cases without</i>	<i>Cases with</i>
	<i>Complications.</i>	<i>Complications.</i>
	<i>Per cent.</i>	<i>Per cent.</i>
Births, 1934	7.7
Investigated Maternal Deaths, 1929-34	19.7
		59.1

It may be concluded from these figures that operative measures are usually resorted to because of complications.

When the percentages for the respective groups maternity, midwifery and hospital cases are examined it is found that for the births (see first Table above) the rate of interference is highest for maternity cases and lowest for midwifery cases. The contrast in the percentages is striking for the births without complications. The rate of interference for hospital cases is noticeably lower than for maternity cases (especially for the births without complications), but is higher than for the midwifery cases. As regards the maternal deaths (the second Table above) the percentage is slightly higher for hospital cases (64.5 per cent.) than for maternity cases (61.6 per cent.), but both these percentages are markedly higher than the percentage for midwifery cases (44.0 per cent.).

While the rate of interference is shown to be definitely higher among maternity and hospital cases than among midwifery cases it does not, of course, necessarily follow that these higher percentages are due to unnecessary interference or that, in the case of the deaths, interference was contributory to death. As already pointed out (page 103) the maternity cases contain a larger proportion of primiparous births and of women who had trouble during pregnancy or at a previous confinement, and in the case of the hospital group the majority of the patients

were no doubt sent to hospital because of a condition which indicated the need for some operative treatment.

Nevertheless the marked differences do suggest that some of the interference was unnecessary, and particularly so among maternity cases. It is difficult to believe that interference was necessary in so high a number as 31.2 per cent. of the uncomplicated maternity cases when for uncomplicated midwifery cases the percentage was only 3.3. Moreover, the fact that interference took place in 19.7 per cent. of the investigated maternal deaths in 1929-34 where no complications were present at birth, might justify the view that interference in some cases had an influence upon the eventual death.

Interference is believed to be more common than formerly; although one object of the increased provision made for antenatal care is to reduce the need for operative measures at birth. Figures similar to those above as to the extent of interference in earlier years cannot be given, but from inquiries and from observations it appears that a good deal of the instrumental midwifery by doctors under modern conditions of medical practice is unnecessary and that this unnecessary interference has played some part in increasing the maternal mortality rate in Wales.

The main reasons why operative measures are common at birth appear to be:—

(1) The tendency to increased operative work and active treatment in medicine generally has extended to midwifery, and the methods of expectant treatment do not appear to be as popular as they should be.

(2) The proportionate increase in the number of first births. The greater tediousness and delay in labour of these births is an inducement to hurry the delivery.

(3) Women are not prepared to stand the pains of child-birth to the same extent as formerly. Anaesthesia is expected by the patient at an early stage of labour and is frequently given without the purely obstetrical indications being manifest. In such cases the prospect of manipulative interference being necessary later is increased.

An analysis of the various types of interference among the maternity, midwifery and hospital cases (including miscarriages) is given in Appendix XIX.

Conduct of Labour.

An attempt has been made to form impressions of the technique used in domiciliary midwifery. It is, however, difficult to comment on this matter except in general terms. Not much variation has been found in the methods or standards in different classes of district. Some districts are better supplied than others

with hospital facilities and specialist services, and these advantages possibly have a quietly educative effect upon the technique of practice.

As far as observation was possible it would appear that the average practitioner carries suitable equipment for the normal case, or the case in which simple interference is necessary, but it is unusual for him to possess the instruments and apparatus necessary for dealing with the less frequent complications.

The most common antiseptic is lysol, but dettol is being increasingly used. The usual procedure is to scrub up in a pan of water to which a little antiseptic has been added. The vulval area is cleansed by means of antiseptic swabs.

Usually a clean apron but no sterile gown is worn, and masks are the exception; gloves also are rarely used. The towels are clean, but not sterile. Forceps are in many cases either sterilized at home or in a portable sterilizer, but the usual method is to place them for a time in a ewer of boiling water to which a strong antiseptic has been added. Afterwards they are placed ready for use in a clean towel. The method of delivery is usually orthodox. If a tear occurs it is stitched up immediately with silkworm gut. Rarely are tears in the cervix stitched and tears of the vagina are often left, but when they are sutured catgut stitches are used.

From this description of the usual technique it will be evident that the antiseptic chain may be broken at various points; this, however, becomes less likely when the accoucheur has the assistance of a well-trained nurse or another doctor or both. Obviously delivery in houses unprovided with proper facilities is more difficult than in more fortunately circumstanced homes. A high standard of antiseptic technique is obviously more difficult to attain under poor conditions.

Team work in midwifery and the preservation of an antiseptic attitude have not developed in the same way as in surgery, nor do most doctors approach a midwifery case in the same way as they would a surgical operation.

The Anaesthetic.

The anaesthetic used in most domiciliary confinements is chloroform; in a few instances only was there any record of cases where ether was used or where any type of gas and oxygen apparatus was employed. In partnership practices the chloroform is often administered by a colleague, but where the doctor works single-handed the anaesthesia is induced by him; and the midwife keeps the patient under the anaesthetic while the doctor delivers. The number of cases in which an anaesthetic was given alone and not followed by operative interference was comparatively small (see Appendix XIX).

In hospital practice gas and oxygen apparatus are increasingly used in midwifery; when operative interference is necessary

chloroform alone or chloroform and ether is given. This is not the place to discuss the merits or demerits of any particular anaesthetic, but it does appear that the use of such anaesthetics as gas and oxygen, and ether, which are generally accepted as being safer, has not increased as much as might be expected. There are, it is recognised, objections to ether and to gas and oxygen in domiciliary practice. Ether is dangerous with naked lights, and requires the continued attention of an anaesthetist to keep the patient sufficiently anaesthetised, while the apparatus required for gas and oxygen is expensive and bulky, and its use at times requires more than ordinary skill. Chloroform for these reasons remains the most popular anaesthetic. It would appear, however, that in institutions there is no reason why gas and oxygen should not be used more often, and that in domiciliary practice where a second doctor is available, and the circumstances are favourable, ether might be used more frequently.

It was found that a portable apparatus for the administration of carbon di-oxide or carbon di-oxide in combination with oxygen is now often carried. This is primarily for the resuscitation of newly-born infants, but it may be called into use during the anaesthetising of the mother.

The use of sedative drugs in the first stage of labour did not appear to be a common practice; and on many occasions opinions were expressed by practitioners condemning their use. It is felt that the careful treatment of the first stage of labour was one direction in which improvement might have been expected in recent years.

Forceps.

The usual type of forceps is the ordinary Nevill's or Milne Murray's with a pelvic curve. Axis traction rods and tapes do not seem to be commonly employed, but traction handles are often used. The method common in domiciliary practice is to apply the forceps in the left lateral position, and the blades are introduced with the right hand, being covered and protected with the left. To what extent forceps are applied before the os is fully dilated is not known, but it seems probable that in many cases the requisite time is not given for the head to mould and come down into the pelvis. The result of premature application of the forceps often transforms an easy delivery into a difficult one, but the use of forceps when the head is on the perineum has not the same objections, and provided that all antiseptic precautions are taken, a forceps delivery provides better control of the head.

Craniotomy.

It is shown from the statistics in Appendix XIX that craniotomy is a rare type of interference. The method is usually attended with danger and is employed only as a last resort.

Internal Version.

The generally accepted indications for version are such conditions as marginal placenta praevia, prolapsed cord, and cases of malpresentation such as the transverse position or where twins are present. A number of cases, however, have been encountered in which the turning of a vertex into a breech presentation was performed with no more indication than a delayed labour and as an alternative to the use of forceps. There are certain cases of vertex presentations which present difficulty because the head remains above the brim during the first stage of labour when possibly version might be justified, but these cases are rare. The breech presentation which results from the version is likely to become complicated, with a consequent increased risk to the child, while the entry of the hand into the uterus, and intra-uterine manipulations, are not without danger to the mother.

Removal of Placenta.

By this is meant manual removal. It was found that this form of interference was commoner than might be expected. It appeared that in some of these cases too short a time was given for delivery of the placenta. The same remarks apply to this method as to internal version, only with even more point, as the hand is introduced into the uterus and manipulations performed in contact with the placental site.

Other Interferences.

Induction of labour does not seem to have been attempted often enough. Records of cases have been examined, especially of intercurrent disease, where early induction might have saved the life of the patient, and in some cases might have meant restoration of health on the termination of the pregnancy. It is, of course, much better for this treatment to be undertaken in hospital, but the paucity of hospital beds as well as the reluctance of many patients to enter hospital, makes it difficult to arrange for such treatment.

Caesarean Section.

The proportion of deliveries by Caesarean section is difficult to state with accuracy, as these cases do not, from their very nature, occur in domiciliary practice and the operation in hospital is often performed in general wards where no record of maternity cases is kept. Appendix XIX shows the number of these operations in the records available. There were districts where the number was excessive. Thus in one town where there are about 600 births a year, 40 Caesarean operations were performed in 1934, and a similar number in 1935. It appears that the remarks which have been made regarding interference in general may be applied particularly to delivery by abdominal section, and that this method of interference is used with too much freedom.

SUMMARY.

1. *High Puerperal Death-rates throughout Wales.*

The death-rate among women in childbirth is high in all parts of Wales. For the period 1924-33 the puerperal mortality rate for Wales was 35 per cent. in excess of the rate for England (page 17).

2. *Puerperal Sepsis and other Puerperal Causes.*

The death-rates are high both from

- (i) puerperal sepsis; and
- (ii) other puerperal causes.

Although both rates are high, the rates are excessively high in the second group (page 14).

3. *Improvement in Medical Certification.*

Between 1924-8 and 1929-33 the puerperal mortality rate for Wales increased from 5.34 to 5.85 per 1,000 live births, that is, by 9.6 per cent. It is believed, however, that medical certification has improved and that with greater accuracy in certification more deaths than formerly are now assigned to a puerperal cause. The actual increase in puerperal mortality between the two periods would probably, therefore, be less than 9.6 per cent. (page 19).

4. *Death-rates in Industrial and Rural Areas.*

There is little difference in the death-rates of the industrial areas and the rural areas, taken in the aggregate. The death-rate from puerperal sepsis is lower in rural Wales than in industrial Wales (page 24).

There has been an appreciable decrease in the puerperal mortality rates in all the four county boroughs, but an increase in almost every other industrial area. In rural areas the mortality rates have not shown any important variations, and increases in some districts are balanced by decreases in others (pages 18 and 25).

5. *The Special Areas.*

The rates in the Special Areas have increased substantially, whereas the other areas in Wales in the aggregate show a small decrease. The excess puerperal mortality in the Special Areas may be the cumulative result of a variety of unfavourable factors working in association (page 87).

6. *Abortion.*

The death-rates from abortion per 1,000 births are high in South Wales and have increased. In rural Wales the rates are relatively low and show no increase. It is believed that procured abortion has become more common in the industrial areas, and has been a factor of some influence in the increased

maternal risk in these areas. Procured abortion appears to be infrequent in rural Wales.

There is no means of ascertaining the number of abortions which occur in the country, and in the absence of this information no reliable estimate can be made of the extent to which the incidence of abortion may have increased or decreased in different parts of Wales. For the same reason it is not possible to state a case fatality rate for abortion. The number of deaths from criminal abortion in Wales has increased, but there has been a decrease in the number of deaths from spontaneous abortion. This decrease, however, has been proportionately less than the decrease in the number of births. The difficulties in the study of this important subject are discussed at length in the chapter on "Abortion" (page 68).

7. *The Health of the Mother.*

If mortality rates are a measure of sickness rates there would appear to be a high incidence of sickness and ill health among the women of childbearing age in Wales. In England, when large divisions of the country are considered and compared, the puerperal mortality rates of these divisions are found to vary in much the same way as the death-rate among women from all other causes; where the general death-rate is high the puerperal mortality rate is high also, and vice versa. The non-puerperal death-rates in Wales are higher than in any of the main geographical divisions of England; so also are the puerperal death-rates (pages 79 and 80).

It is believed that an excessive incidence of intercurrent disease among the expectant mothers in Wales has been an important contributory cause in producing the high maternal mortality rates, for intercurrent disease superimposes another risk upon the normal risks attending pregnancy and childbirth. Much may be done to improve the general health by better education of girls and women in matters relating to nutrition, physical fitness and personal and domestic hygiene (page 81).

Industrial Wales has felt the effects of long continued trade depression, and in rural Wales the standard of living has always been low. Anaemia and debility of varying degrees are not uncommon and may partly be the result of poor nutrition. While inadequate dietary and wrong feeding may be factors in the production of the high maternal mortality rate in Wales, their influence cannot at the moment be accurately assessed (pages 93 and 94).

8. *The Mother's Responsibility.*

It needs to be emphasised that however efficient may be the services provided for safe childbirth, these services cannot be fully effective unless the woman recognises her own individual responsibility for care and attention to the hygiene of pregnancy. A number of deaths are caused largely through ignorance,

carelessness or neglect by the mother. In a sample of 1,079 maternal deaths which occurred during 1929-34 it was considered that in 195 cases (that is, 18 per cent), death might not have occurred if due care had been taken by the patient, her friends and relatives (pages 100 and 101).

9. *Ante-Natal Care.*

Efficient ante-natal care would considerably reduce the present high death-rate. The importance of such care is only slowly being realised, especially in rural Wales (page 100). The provision made for ante-natal care by most Local Authorities in Wales is inadequate, but often where it is adequate many of the women who receive pre-natal attention do not take advantage of the facilities available until late in pregnancy (page 97). At some clinics the number of women seen at a session is much too large for careful examination of each individual case (page 29).

Of the 1,079 maternal deaths investigated it was found that in 34 per cent. of the cases the woman received no ante-natal care of any kind. It is possible that as many as one-fifth of these deaths (212) might have been prevented if adequate ante-natal care had been given. Of these 212 deaths, in 86 cases the woman received no ante-natal care and in the remaining 126 cases some care was given (pages 97 to 100).

10. *Risk according to Age and Parity.*

The risk of death increases with age and the mortality rate after age 35 is roughly $2\frac{1}{2}$ to 3 times that for ages under 25. For most causes of death the risk appears to fall slightly after age 40. The mortality rate after age 25 appears to increase relatively less in rural than in industrial districts (pages 54 and 55). Women in rural Wales marry at later ages than women in the industrial districts, but the fertility rate appears to be higher in the rural districts (pages 10 and 11). If the age distribution of mothers was the same in rural as in industrial Wales the puerperal mortality rate for rural Wales would probably be slightly reduced (page 54).

The risk of death increases considerably with age for first pregnancies. The lowest mortality rate occurs among second, third and fourth pregnancies in women under 30 years of age, where the mortality rate appears to be about one-half to three-quarters of the rate for all pregnancies at all ages. The mortality rate increases less with age after the first childbirth, and age does not appear to be a factor of great importance after the fourth childbirth. Generally speaking the risk of death is lower than average for pregnancies after the first where the women are under 35 years of age. The greatest risk is shown for first and second pregnancies occurring after age 35 (page 58).

Particular attention should be given during the ante-natal stage to women whose confinement, from considerations of age

and parity, may be attended with more than average risk; this may mean the admission of more of these cases into maternity homes, especially in those parts of Wales where the delivery would take place under difficult conditions and in unsatisfactory surroundings (page 59).

11. *Contraception.*

Contraceptive practice increases the proportion of first pregnancies, and a longer spacing of births tends also to increase the age of the mother at the birth of second and succeeding children. On the other hand, there is now a smaller proportion of pregnancies of high parity occurring in the later age groups, and on the evidence examined there are no strong grounds for believing that extended use of contraceptive methods has significantly influenced maternal mortality (page 58).

12. *Illegitimacy.*

The illegitimate birth-rate is high in rural Wales, being roughly twice the rate in industrial Wales, which has a slightly lower rate than England. The puerperal mortality rate is higher among single than married women, but it does not appear that this excess has any appreciable effect on total puerperal mortality, even in rural Wales where the illegitimate birth-rate is high (pages 59 to 62).

The illegitimate birth-rate has been increasing in all classes of area. It has been accompanied by a decrease in the puerperal mortality rate among single women in the county boroughs, but an increase in the other industrial districts (page 61). Abortion is a much more common cause of puerperal death among single women in rural Wales than among single women in industrial Wales (page 75).

13. *Stillbirths and Neo-Natal Deaths.*

Associated with the high maternal death-rate is a high stillbirth frequency. The Welsh stillbirth frequency for 1928-33 was 38 per cent. above the English frequency. The Welsh neo-natal death-rate (i.e. of infants 0-4 weeks) for 1924-33, also, shows an excess of 12 per cent. over the English rate. It seems probable that if measures taken to reduce maternal mortality are successful, then a corresponding and no less satisfactory result will be found in the stillbirth rate and the neo-natal death-rate (pages 17 and 66).

The stillbirth frequency and the neo-natal death-rate vary for age and parity in much the same way as the puerperal mortality rate varies. It appears, also, that age and parity influence puerperal mortality and stillbirth frequency less in rural than in industrial Wales (page 66).

14. *Malpresentation.*

Of a representative sample of *births* attended by midwives in 1934 there was malpresentation in only 5 per cent. of the cases,

a figure which is not unusually high. In a sample of *maternal deaths* which occurred during 1929-34, there was malpresentation in 15 per cent. of the cases. It does not appear, from the investigations made, that malpresentation is a factor of influence in producing the high maternal mortality rate in Wales (pages 66 and 67).

15. *Cases attended by Practitioners.*

Doctors now attend fewer confinements than formerly. This is largely because of (a) the progressive decline in the number of births, and (b) the increase in the number of cases dealt with solely by midwives. An estimate of the average number of cases seen by doctors in practice during 1934 works out at about 17 cases (page 105). Of a sample of 33,447 domiciliary cases attended by midwives during 1934 no doctor was in attendance at birth in 20,195 of the cases. As a rule a doctor is booked only where the woman is able to afford his services or where symptoms are present or difficulty is anticipated (page 104).

Suggestions made for improving the conditions of work in domiciliary practice are discussed in the section of the report on "Midwifery Practice of General Practitioners" (page 105).

16. *Interference.*

Interference at birth is believed to be more common than formerly. A good deal of the instrumental delivery by doctors under modern conditions of medical practice is unnecessary, and this unnecessary interference has played some part in increasing the maternal mortality rate in Wales (page 110).

17. *Midwives.*

The practice of midwifery, generally speaking, has not attained a high standard of efficiency. A higher standard of efficiency was found among nurses employed by an institution or association than among the independent midwives, and can be attributed to the discrimination exercised in the appointment of these nurses and the supervision of their work (page 32).

The number of cases attended by some of the midwives was too small to enable the midwife to maintain her skill or to obtain an adequate and secure income. The remuneration in many cases was insufficient to attract the well-qualified nurse (page 34).

18. *Hospital Accommodation.*

The proportion of beds provided for maternity cases in Wales is considerably below that in England, and there also exists a reluctance on the part of women in many districts in Wales to enter a hospital or maternity home (pages 102 and 103). For complicated cases and cases where the home circumstances are not favourable an adequate number of beds should be provided,

and at these hospitals the family doctor should be given every opportunity for observing the conduct of the case by the specialist in charge (page 106).

19. *Maternity Services.*

The maternity services of most of the Local Authorities are inadequate. Maternity schemes have been developed only in the four county boroughs and in Glamorgan, Monmouthshire and Flintshire. In the rest of Wales, which is mainly rural, very little maternity work is undertaken by Local Authorities either during the ante-natal period or at the confinement. There is great need for the expansion of maternity services in Wales on carefully considered lines (page 27).

20. *Concluding Observations.*

There is no single or simple solution to the problem of maternal mortality. Various causes contribute to the high maternal death-rate in Wales. Much of the loss of life from childbirth is avoidable and could be prevented if proper measures were taken. It is only gradually, by steady resolve to secure improvement and determined and continuous action to that end, that reduction in mortality will come. All parties concerned, the mother, the doctor, the nurse, the Local Authorities, and the State as representative of public opinion, have their respective functions.

First, there must be a recognition of the fundamental importance of sound general health. Pregnancy is a normal and natural physiological function, and women should be encouraged to regard childbearing in this light. The right attitude of mind, however, comes more easily when the woman is healthy and realises her responsibilities, and the home surroundings are good.

It is upon the woman herself that the first duty and the greatest responsibility rest. She must co-operate at all stages, in all measures which will help to a safe conclusion of the pregnancy. Careful attention to personal hygiene, a readiness to put herself under medical supervision, and a loyal acceptance of the advice given, will prevent the occurrence of difficulties which may prejudice the chances of successful childbirth.

Ante-natal attention should be wisely directed and the confinement should be in trained hands. There should be adequate ante-natal care, for the more appropriate the attention during pregnancy the less likely will there be untoward results at childbirth.

Parliament has given to the Local Authorities wide powers in regard to public health, and there has been growing acceptance of the importance of maternity in the development of the health services. The efficiency of the provision made for maternity must depend largely on local initiative, planning

and supervision, and the intelligent use by the woman of the services available. It is important that the services should be well conceived and wisely utilised; schemes ambitiously framed and administered at great cost can yet be wasteful in result.

Public opinion is fully alive to the gravity of the problem, but there is not always a true appreciation of the real nature and extent of the problem or of the difficulties. Many deaths occur from other causes than pregnancy or childbirth which in the present state of knowledge can be classed as avoidable. It may confidently be hoped that with a wider recognition of the principles of preventive medicine in maternal welfare work there will come a progressive reduction in maternal mortality and morbidity and a greater saving of child life. With every attention and every care, however, there will still remain a certain number of women who will not survive childbirth. It is the national duty to reduce this number to the minimum.

Recommendations.

1. Every Local Authority should organise and provide an efficient and complete maternity service which should be available to every mother. The service should provide for care during the ante-natal period, attention during childbirth and the puerperium, and for post-natal care. The scope and character of the service should be made widely known throughout the area and women should be encouraged to take advantage of the facilities and advice available early in pregnancy. The resources of the services should at every stage be available to private practitioners and midwives who have accepted responsibility for the conduct of maternity cases.

2. The essentials of a good service are:—

- (i) A sufficient supply of competent midwives.
- (ii) Skilled medical attention which should reach every mother during pregnancy, labour and the puerperium.
- (iii) The provision of hospital beds for those women requiring them either on account of abnormality at any stage or because of unsuitable home conditions.

It should be the duty of every Local Authority to see that these essentials are within the reach of every mother.

3. So far as administrative arrangements permit, all services rendered to the mother during pregnancy, childbirth and the puerperium in an area should come under the supervision of a single authority. The most convenient unit would be the County or County Borough; for the purpose of hospital provision in some cases, more economical working would be attained if two or more counties were combined.

4. The essential link between the mother and the authority should be the midwife, and a local supervising authority is now required to establish an adequate midwifery service. The standard of efficiency should then be maintained by refresher courses and by attendance at the authority's own clinics and hospitals. The midwife should then be competent to relieve the clinics of much of the routine examination which now over-loads the work of the Medical Officers.

5. The supervision of the expectant mother should begin with the first consultation of the midwife, who should, with the woman's consent, inform the authority of the case. Thereafter the authority should be responsible either through its midwives, its doctors or its clinics for the proper conduct of the case through pregnancy, childbirth and the puerperium.

6. The Local Authority should provide ante-natal supervision by means of

- (i) Clinics in populous areas.
- (ii) A General Practitioner service where clinics are not practicable.

Ante-natal clinics may be of two types—

- (a) A clinic for routine examination.
- (b) A consultant clinic or centre to which cases may be referred from the routine clinic or by general practitioners.

It is essential that the officer in charge of the routine clinic should possess such qualifications and experience as will command the confidence of the general practitioners and midwives of the area. The Medical Officer should be experienced in both obstetrics and ante-natal work and should preferably have held a resident appointment in a maternity hospital and have had experience in its ante-natal department. Sound experience in clinical medicine is also essential.

Midwives should be asked to accompany their patients to the clinic, and education of the mother in the hygiene of pregnancy should be the duty of midwives, health visitors, and the clinic Medical Officer.

A consultant clinic or centre, to which women requiring further investigation or treatment may be referred by the general practitioners or from the routine clinic, should be within reasonable reach of every area. Consultation for medical conditions should also be available. Such a clinic should, if possible, be held at a hospital. In populous areas where a large number of cases are likely to be referred, consulting sessions should be held at least once weekly. In other areas it will probably be more convenient if the consultant can be seen by appointment.

Each ante-natal clinic should work in association with a hospital so that cases may be admitted when necessary without any delay.

7. Domiciliary attention devolves upon midwives and medical practitioners. Medical practitioners who engage in midwifery within the scheme of the Local Authority should be those who are specially interested and experienced in maternity work. The local supervising authority, in consultation with the local medical profession, should, in future, be empowered to take steps to ensure that the best local obstetric skill is made available in all cases in which midwives are required, under the rules of the Central Midwives Board, to call in a doctor. The services of a consultant should be available in the home if the practitioner needs help. Operative interference should not be carried out in the home except in cases of emergency.

8. Hospital beds should be provided for all cases which on account of abnormality in pregnancy, labour or the puerperium or of poor home conditions would be more suitably treated in a properly equipped hospital. It is important that an efficient transport service should be arranged to enable cases from a distance to be removed to hospital. Major operative work should ordinarily be performed by men of consultant rank.

9. Suitable accommodation should be provided for cases of puerperal fever and puerperal pyrexia, and the treatment of such cases should where possible be under the supervision of a consultant.

10. Cases should be followed up after the confinement. Post-natal examination should be carried out and if necessary treatment given either by the Medical Officer of the clinic or by a consultant, so that morbid sequelae of childbirth can be prevented and the woman does not enter a future pregnancy under handicap.

11. Under the general scheme as outlined, the general health of the mother, her education in the affairs of motherhood, the problem of help in the home, the provision of extra nourishment, and all affairs relating to the pregnancy, would be under the supervision of one or other branch of the service.

12. In rural areas arrangements for securing an efficient and complete maternity service would necessarily be different from those in populous areas. The midwives in rural districts should be provided with means of transport and communication. The services of a consultant should be available through the Local Authority. Arrangements should be made for earlier admission to hospital of potentially difficult cases, and transport for all cases should be available. Where practicable beds should be provided at existing hospitals, but in some rural areas it might be possible to establish one or two beds at the headquarters of the district midwife.

MAP showing the Puerperal Death-rate for the Period 1924-33 for each Administrative County in Wales. The death-rates (in brackets) are expressed per 1,000 live births.



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APPENDIX I.

List of Maternity and Child Welfare Authorities in Wales.*County Councils.*

Anglesey.
Brecon.
Caernarvon.
Cardigan.
Carmarthen.
Denbigh.
Flint.
Glamorgan.
Merioneth.
Monmouth.
Montgomery.
Pembroke.
Radnor.

Urban District Councils.

(all in Glamorgan).
Aberdare.
Barry.
Bridgend.
Caerphilly.
Gellygaer.
Glyncorrwg.
Llwchwr.
Maesteg.
Mountain Ash.
Ogmore and Garw.
Penarth.
Pontypridd.
Porthcawl.
Rhondda.

County Borough Councils.

Cardiff.
Merthyr Tydfil.
Newport.
Swansea.

Rural District Councils.

(all in Glamorgan).
Cardiff.
Cowbridge.
Gower.
Llantrisant and Llantwit Fardre.
Neath.
Penybont.
Pontardawe.

Town Councils.

Carmarthen (Carmarthenshire).
Colwyn Bay (Denbighshire).
Cowbridge (Glamorgan).
Llanelli (Carmarthenshire).
Neath (Glamorgan).
Port Talbot (Glamorgan).
Wrexham (Denbighshire).

APPENDIX II.

Note on the Regional Grouping of Wales into (1) Industrial Areas; (2) Non-Industrial Areas.

The Registrar-General publishes statistics for two regions in Wales, designated Wales I and Wales II. Wales I comprises the four counties of Glamorgan, Monmouth, Brecon and Carmarthen (with associated county boroughs) situated on the South Wales coalfield, and Wales II comprises the rest of Wales containing for the most part an agricultural population. The 1934 populations and acreage were:—

	<i>Population.</i>	<i>Acreage.</i>
Wales I	1,867,000	1,928,000
Wales II	687,400	3,202,000

Broadly speaking, therefore, region Wales I presents the one extreme of a highly industrialised population engaged in coal-mining and metal manufacture and Wales II the other extreme of a sparsely populated rural area.

The counties of Monmouth, Brecon and Carmarthen, however, are partly rural, while coal-mining is carried on in Denbighshire and Flintshire. A more exact division of Wales into the two classes of area (1) industrial, (2) non-industrial, is made by a grouping of areas as shown below. It will be observed that:—

- (a) Glamorgan is treated as wholly industrial;
- (b) the counties of Monmouth, Brecon, Carmarthen, Denbigh and Flint are treated as partly industrial and partly non-industrial;
- (c) the counties of Anglesey, Caernarvon, Cardigan, Merioneth, Montgomery, Pembroke and Radnor are treated as wholly non-industrial (slate quarrying is carried on in Caernarvonshire and Merionethshire, but it was considered that for the purposes of classification these counties could appropriately be classed as non-industrial).

WHOLLY INDUSTRIAL COUNTIES.

The County of Glamorgan, with the three associated County Boroughs.

WHOLLY NON-INDUSTRIAL COUNTIES.

The Counties of Anglesey, Caernarvon, Cardigan, Merioneth, Montgomery, Pembroke and Radnor.

COUNTIES PARTLY INDUSTRIAL AND PARTLY NON-INDUSTRIAL.*Industrial.**Non-Industrial.**Monmouthshire.*

Newport C.B.	Abergavenny M.B.
Abercarn U.D.	Caerleon U.D.
Abersychan U.D.	Chepstow U.D.
Abertillery U.D.	Monmouth M.B.
Bedwas and Machen U.D.	Usk U.D.
Bedwellty U.D.	Abergavenny R.D.
Blaenavon U.D.	Chepstow R.D.
Ebbw Vale U.D.	Magor R.D.
Llanfrechfa Upper U.D.	Monmouth R.D.
Llantarnam U.D.	
Mynyddislwyn U.D.	
Nantyglo and Blaina U.D.	
Panteg U.D.	
Pontypool U.D.	
Pontypool R.D.	
Rhymney U.D.	
Risca U.D.	
Tredegar U.D.	
St. Mellon's R.D.	

*Industrial—cont.**Non-Industrial—cont.**Breconshire.*

Brynmawr U.D.
Crickhowell R.D.
Vaynor and Penderyn R.D.
Ystradgynlais R.D.

Brecknock M.B.
Builth Wells U.D.
Hay U.D.
Llanwrtyd U.D.
Brecknock R.D.
Builth R.D.
Hay R.D.

Carmarthenshire.

Ammanford U.D.
Burry Port U.D.
Cwmamman U.D.
Kidwelly M.B.
Llanelli M.B.
Llandilo Fawr R.D.
Llanelli R.D.

Carmarthen M.B.
Llandilo U.D.
Llandovery M.B.
Newcastle Emlyn U.D.
Carmarthen R.D.
Llandovery R.D.
Llanybyther R.D.
Newcastle Emlyn R.D.
Whitland R.D.

Denbighshire.

Wrexham M.B.
Wrexham R.D.

The rest of the county.

Flintshire.

Buckley R.D.
Connah's Quay U.D.
Flint M.B.
Holywell U.D.
Hawarden R.D.
Holywell R.D.

Mold U.D.
Prestatyn U.D.
Rhyl U.D.
Overton R.D.
St. Asaph (Flint) R.D.

APPENDIX III.

Note on Statistics for Geographical Sections of England and Wales.

As from 1931 a revised regional grouping of England and Wales for statistical purposes was adopted by the Registrar-General as shown below. Previously statistics were published for four main Divisions of England and Wales, namely :—

North	...	...	(now divided into North I, II, III and IV).
Wales	...	...	(,,,, Wales I and II).
South (including London)	...		(now covered by (1) the new South West region, (2) the southern section of the new South East region).
Midlands	...	...	(now covered by (1) Midland I and II, (2) the new South East region (eastern and midland sections)).

<i>Greater London.</i>	<i>North I.</i>	<i>Midland II.</i>	<i>Wales I.</i>
The area coincident with the City of London and Metropolitan Police Districts—approximately 15 miles radius from Charing Cross.	Durham. Northumberland.	Derbyshire. Leicestershire. Northamptonshire. Nottinghamshire. Peterborough, Soke of.	Breconshire. Carmarthenshire. Glamorgan. Monmouthshire.
<i>South East (including Greater London).</i>	<i>North II.</i> Cumberland. Westmorland. Yorkshire, East Riding Yorkshire, North Riding.	<i>East.</i> Cambridgeshire. Ely, Isle of Huntingdonshire. Lincolnshire— Parts of Holland. ,, „ Kesteven. ,, „ Lindsey. Norfolk. Rutlandshire. Suffolk, East. ,, West.	<i>Wales II.</i> Anglesey. Caernarvonshire. Cardiganshire. Denbighshire. Flintshire. Merionethshire. Montgomeryshire. Pembrokeshire. Radnorshire.
Bedfordshire. Berkshire. Buckinghamshire. Essex. Hertfordshire. Kent. London. Middlesex. Oxfordshire. Southampton. Surrey Sussex, East. ,, West. Wight, Isle of	<i>North III.</i> Yorkshire, West Riding. York C.B. <i>North IV.</i> Cheshire. Lancashire.	<i>South West.</i> Cornwall. Devonshire. Dorsetshire. Somersetshire. Wiltshire.	
	<i>Midland I.</i> Gloucestershire. Herefordshire. Shropshire. Staffordshire. Warwickshire. Worcestershire.		

APPENDIX IV.

Births in Wales, 1934, per 1,000 of the Population and per 1,000 Acres.

Administrative Area.	Population, 1934.	Acreage.	No. of Births, 1934.	Birth-rate per 1,000 population, 1934.	No. of Births per 1,000 Acres.
<i>Industrial Counties.</i>					
Glamorgan ...	751,650	469,112	12,377	16.5	26.4
Monmouth ...	338,950	345,001	5,591	16.5	16.2
	1,090,600	814,113	17,968	16.5	22.1
<i>Semi-Industrial Counties.</i>					
Brecon ...	56,150	469,281	833	14.8	1.8
Carmarthen ...	177,350	588,472	2,635	14.9	4.5
Denbigh ...	156,700	427,977	2,240	14.3	5.2
Flint ...	114,950	163,707	1,712	14.9	10.5
	505,150	1,649,437	7,420	14.7	4.5
<i>Rural Counties.</i>					
Anglesey ...	47,950	176,694	746	15.6	4.2
Caernarvon ...	119,400	364,108	1,593	13.3	4.4
Cardigan ...	53,950	443,189	657	12.2	1.5
Merioneth ...	41,500	422,372	571	13.8	1.3
Montgomery	46,700	510,110	697	14.9	1.4
Pembroke ...	85,650	393,003	1,327	15.5	3.4
Radnor ...	20,600	301,165	291	14.1	1.0
	415,750	2,610,641	5,882	14.2	2.2
<i>County Boroughs.</i>					
Cardiff ...	221,050	11,984	3,503	15.8	292.3
Merthyr Tydfil	68,700	17,760	1,018	14.8	57.3
Newport ...	87,600	4,568	1,491	17.0	326.3
Swansea ...	165,550	21,600	2,674	16.2	123.8
	542,900	55,912	8,686	16.0	155.3
Wales, All Areas	2,554,400	5,130,103	39,956	15.6	7.8
England and Wales	40,467,000	37,339,320	597,642	14.8	16.0
England ...	37,912,600	32,209,217	557,686	14.7	17.3

APPENDIX V.

Number of Single Women per 1,000 of all Women (Married and Single) in Age Groups, 1921 and 1931, in Wales, England and Wales, and certain Regions of England.

Age Period.	England and Wales.		Wales.		Wales I.		Wales II.		London and the five surrounding Counties.		Northern England.	
	1921.	1931.	1921.	1931.	1921.*	1931.	1921.*	1931.	1921.	1931.	1921.	1931.
Ages 15 and up	368	354	352	333	—	313	—	380	386	374	363	349
15-19 ...	982	982	975	977	—	974	—	986	985	984	981	982
20-24 ...	726	742	675	711	—	685	—	787	754	761	712	741
25-34 ...	337	330	300	313	—	280	—	403	365	352	326	327
35-44 ...	192	194	158	163	—	134	—	239	213	215	181	185
45-54 ...	164	164	130	131	—	101	—	201	183	181	148	152
55-64 ...	153	156	120	122	—	88	—	191	171	173	136	140
65-74 ...	139	158	113	123	—	88	—	184	159	173	119	138
75-84 ...	132	147	105	109	—	74	—	158	154	165	109	125
85 and over	130	142	93	94	—	69	—	128	149	158	115	121

* Figures for Wales I and Wales II for 1921 have not been published.

Wales I embraces the geographical counties of Brecon, Carmarthen, Glamorgan and Monmouth.

Wales II covers the rest of Wales.

Northern England embraces the counties of Cheshire, Cumberland, Durham, Lancashire, Northumberland, Westmorland and Yorkshire.

It will be observed that the figures for Wales I and Wales II show opposite extremes, the figures for England and Wales being (quite roughly) the mean of those for the two Welsh regions.

APPENDIX VI.

Number of Puerperal Deaths in the Administrative Counties and County Boroughs of Wales, 1924-33, classed according to separate Cause of Death.

Administrative Area.

International List Group Numbers
(for titles see Appendix XVI).

Total
Puerperal
Deaths
(140-150).

131

	140	141	142	143	144	145	146	147	148	149	150	Total Puerperal Deaths (140-150).
<i>Administrative Counties.</i>												
Anglesey	4	—	—	4	20	9	7	7	1	54
Brecon	4	2	—	5	14	11	2	2	—	45
Caernarvon	1	8	—	12	18	26	4	5	3	89
Cardigan	1	4	—	8	17	6	3	4	1	48
Carmarthen	9	5	—	24	34	65	8	13	25	193
Denbigh	7	3	—	21	51	44	5	15	13	171
Flint	7	6	3	1	11	38	17	6	5	8
Glamorgan	4	54	19	4	109	196	40	70	67	30
Merioneth	2	2	—	6	11	9	—	3	5	40
Monmouth	28	14	4	4	41	85	80	15	23	17
Montgomery	—	2	1	—	2	7	13	1	8	350
Pembroke	4	4	3	1	10	18	14	7	8	40
Radnor	1	1	—	—	4	5	4	—	2	84
Total for Administrative Counties	...	155	113	38	10	257	514	489	92	169	196	80
<i>County Boroughs.</i>												
Cardiff	17	18	3	28	54	26	11	15	15	3
Merthyr Tydfil	7	4	—	7	17	20	1	9	6	193
Newport	5	2	—	7	25	15	1	3	9	76
Swansea	7	8	2	19	47	31	10	11	11	70
Total for County Boroughs	...	36	32	10	5	61	143	92	23	38	53	10
Wales	...	191	145	48	15	318	657	581	115	207	249	90
												2,616

APPENDIX VII.

Number of Puerperal Deaths in the Administrative Counties and County Boroughs of Wales, 1924-33, according to Age and Marital Status.

Administrative Area.		Married Women (including Widows).										Single Women.					
		Total Deaths.	15-	20-	25-	30-	35-	40-	45-	Total Deaths.	15-	20-	25-	30-	35-	40-	45-
<i>Industrial Counties.</i>																	
Glamorgan	...	821	19	131	179	200	192	89	11	52	9	24	12	3	3	1	—
Monmouth	...	330	7	48	67	69	69	43	5	20	4	11	—	3	1	1	—
		1,151	26	179	270	267	132	16	72	13	35	12	6	4	2	—	
<i>Semi-Industrial Counties.</i>																	
Brecon	...	42	2	8	3	13	8	7	1	3	2	1	—	—	—	—	—
Carmarthen	...	178	4	34	47	39	31	22	1	15	3	7	4	1	—	—	—
Denbigh	...	160	1	18	46	37	48	9	1	11	3	1	3	1	2	1	—
Flint	...	105	1	17	19	25	28	12	3	2	—	—	1	1	—	—	—
		485	8	77	115	114	50	6	31	8	9	8	3	2	1	—	
<i>Rural Counties.</i>																	
Anglesey	...	48	—	6	9	19	9	5	—	6	2	—	2	1	1	—	—
Caernarvon	...	81	2	6	15	20	18	16	4	8	—	5	2	3	—	—	—
Cardigan	...	42	—	5	10	11	13	3	—	6	1	2	3	—	—	—	—
Merioneth	...	37	—	6	10	10	9	2	—	3	1	1	1	1	1	—	—
Montgomery	...	34	—	6	12	5	5	6	—	6	1	1	3	1	—	1	—
Pembroke	...	75	1	7	23	16	19	8	1	9	1	4	2	—	3	—	—
Radnor	...	15	—	1	5	4	4	1	—	4	2	—	—	—	—	2	—
		332	3	37	84	85	77	41	5	42	7	13	8	8	2	4	—
Total for Administrative Counties	...	1,968	37	293	469	466	453	223	27	145	28	57	28	17	8	7	—

PROPORTIONATE MORTALITY (TOTAL DEATHS = 100).

Total.	15-	20-	25-	30-	35-	40-	45-	Total.	15-	20-	25-	30-	35-	40-	45-
Industrial Counties	100	2.3	15.5	23.4	23.2	22.7	11.5	1.4	100	18.0	48.6	16.7	8.3	5.6	2.8
Semi-Industrial Counties	100	1.7	15.9	23.7	23.5	23.7	10.3	1.2	100	25.8	29.0	25.8	9.7	6.5	3.2
Rural Counties	100	0.9	11.1	25.3	25.6	23.2	12.4	1.5	100	16.7	30.9	19.0	19.0	4.8	9.6
All Counties	100	1.9	14.9	23.8	23.7	23.0	11.3	1.4	100	19.3	39.3	19.3	11.7	5.6	4.8
County Boroughs	100	1.4	13.8	24.9	23.2	24.4	11.7	0.6	100	25.0	31.3	43.7	—	—	—
Wales...	100	1.8	14.7	24.0	23.6	23.3	11.4	1.2	100	19.9	38.5	21.7	10.6	5.0	4.3

APPENDIX VIII.

Number of Live Births (Legitimate and Illegitimate) in the Counties and County Boroughs of Wales, 1924-8 and 1929-33, distinguishing between Births in Industrial and Non-Industrial Areas.

(For the constitution of areas "Industrial" and "Non-Industrial", see Appendix II.)

Administrative Area.	1924-1928.			1929-1933.		
	Legiti- mate.	Illegiti- mate.	Total Births.	Legiti- mate.	Illegiti- mate.	Total Births.
A.—INDUSTRIAL.						
I.—Industrial S. Wales (excluding County Boroughs).						
Glamorgan ...	81,595	2,651	84,246	62,585	2,433	65,018
Monmouth (part) ...	31,676	1,019	32,695	25,662	906	26,568
Carmarthen (part) ...	11,499	347	11,846	8,740	347	9,087
Brecon (part) ...	3,183	132	3,315	2,450	129	2,579
	127,953	4,149	132,102	99,437	3,815	103,252
II.—County Boroughs.						
Cardiff ...	21,430	790	22,220	17,638	790	18,428
Merthyr Tydfil ...	7,201	241	7,442	5,378	204	5,582
Newport ...	9,174	265	9,439	7,645	264	7,909
Swansea ...	15,372	440	15,812	13,504	404	13,908
	53,177	1,736	54,913	44,165	1,662	45,827
III.—Industrial N.E. Wales.						
Denbigh (part) ...	7,960	385	8,345	6,771	319	7,090
Flint (part) ...	7,260	267	7,527	6,292	255	6,547
	15,220	652	15,872	13,063	574	13,637
IV.—Aggregate of In- dustrial Wales (I, II and III above)...	196,350	6,537	202,887	156,665	6,051	162,716

Administrative Area.	1924-1928.			1929-1933.		
	Legiti- mate.	Illegiti- mate.	Total Births.	Legiti- mate.	Illegiti- mate.	Total Births.
B.—NON-INDUSTRIAL.						
V.— <i>Non-Industrial S. Wales.</i>						
Monmouth (part) ...	4,266	216	4,482	3,576	211	3,787
Carmarthen (part) ...	4,879	282	5,161	4,086	258	4,344
Brecon (part) ...	2,119	139	2,258	1,783	105	1,888
Radnor ...	1,775	151	1,926	1,549	127	1,676
Pembroke ...	7,464	368	7,832	6,538	372	6,910
Cardigan ...	3,729	296	4,025	3,203	283	3,486
	24,232	1,452	25,684	20,735	1,356	22,091
VI.— <i>Non-Industrial N. Wales.</i>						
Denbigh (part) ...	5,222	423	5,645	4,644	327	4,971
Flint (part) ...	2,389	163	2,552	2,199	175	2,374
Anglesey ...	3,864	380	4,244	3,305	409	3,714
Caernarvon ...	8,603	644	9,247	7,837	524	8,361
Merioneth ...	3,400	302	3,702	2,897	249	3,146
Montgomery ...	4,239	367	4,606	3,512	278	3,790
	27,717	2,279	29,996	24,394	1,962	26,356
VII.— <i>Aggregate of Non-Industrial Wales (V and VI above)</i> ...	51,949	3,731	55,680	45,129	3,318	48,447
C.—INDUSTRIAL AND NON-INDUSTRIAL.						
WALES.						
Administrative Counties	195,122	8,532	203,654	157,629	7,707	165,336
County Boroughs ...	53,177	1,736	54,913	44,165	1,662	45,827
All Areas ...	248,299	10,268	258,567	201,794	9,369	211,163

APPENDIX IX.

Number of Deaths from Puerperal Causes in the Counties and County Boroughs of Wales, 1924-28 and 1929-33, distinguishing between Deaths in Industrial and Non-Industrial Areas.

(For the constitution of areas "Industrial" and "Non-Industrial," see Appendix II.)

(I) Total Deaths (Married and Single Women).

Administrative Area.	1924-8.				1929-33.			
	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).	All Causes (140-150).	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).	All Causes (140-150).
A.—INDUSTRIAL.								
I.—Industrial S. Wales (excluding County Boroughs).								
Glamorgan	143	116	205	464	146	115	148	409
Monmouth (part)	43	45	56	144	61	42	70	173
Carmarthen (part)	17	22	28	67	18	25	25	68
Brecon (part)	10	8	4	22	5	4	6	15
	213	191	293	697	230	186	249	665
II.—County Boroughs.								
Cardiff	42	15	53	110	29	22	32	83
Merthyr Tydfil	15	12	19	46	9	9	12	30
Newport	21	10	10	41	9	6	14	29
Swansea	28	24	37	89	26	17	32	75
	106	61	119	286	73	54	90	217

III.— <i>Industrial N.E. Wales.</i>						
Denbigh (part) ...	17	19	18	54	16	21
Flint (part) ...	15	9	21	45	15	11
	32	28	39	99	31	21
IV.— <i>Aggregate of Industrial Wales</i> (I, II and III above) ...	351	280	451	1,082	334	261

V.— <i>Non-Industrial S. Wales.</i>						
Monmouth (part) ...	4	7	18	5	1	15
Carmarthen (part) ...	4	16	36	4	10	22
Brecon (part) ...	2	1	5	1	—	3
Radnor ...	2	3	6	4	1	8
Pembroke ...	4	10	11	18	11	23
Cardigan ...	12	4	18	28	5	52
	28	41	61	130	38	120
B.— <i>Non-INDUSTRIAL.</i>						
VI.— <i>Non-Industrial N. Wales.</i>						
Denbigh (part) ...	14	12	11	37	11	33
Flint (part) ...	6	—	5	6	5	14
Anglesey ...	12	6	13	9	4	23
Caernarvon ...	12	18	19	49	12	40
Merioneth ...	7	4	10	7	5	19
Montgomery ...	4	6	10	21	8	20
	55	46	68	169	42	40
VII.— <i>Aggregate of Non-Industrial Wales</i> (V and VI above) ...	83	87	129	299	80	68
C.— <i>INDUSTRIAL AND NON-INDUSTRIAL.</i>						
WALES.						
Administrative Counties ...	328	306	461	1,095	341	275
County Boroughs ...	106	61	119	286	73	402
All Areas ...	434	367	580	1,381	414	90
						1,018
						217
						1,235
						492
						269

APPENDIX IX—(continued).

(II) Deaths among Married Women only.

Administrative Area.	1924-8.			1929-33.				
	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).	All Causes (140-150).	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).	All Causes (140-150).
A.—INDUSTRIAL.								
I.—Industrial S. Wales (excluding County Boroughs).								
Glamorgan	134	109	198	441	132	103	145	380
...	41	41	55	137	58	40	67	165
Monmouth (part)	...	22	27	66	16	21	25	62
Carmarthen (part)	...	8	4	22	5	3	5	13
Brecon (part)	...							
...								
202	180	284	666	211	167	242	242	620
II.—County Boroughs.								
Cardiff	37	15	53	105	29	21	32	82
...	...	12	19	44	7	8	12	27
Merthyr Tydfil	...	10	10	41	8	6	14	28
Newport	...	22	36	85	26	17	32	75
Swansea	...							
...								
98	59	118	275	70	52	90	212	
III.—Industrial N.E. Wales.								
Denbigh (part)	14	17	16	47	16	10	20	46
...	15	9	20	44	15	11	11	37
Flint (part)	...							
...								
29	26	36	91	31	21	31	31	83
IV.—Aggregate of Industrial Wales								
(I, II and III above)	329	265	438	1,032	312	240	363	915

B.—Non-INDUSTRIAL.

V. Non-Industrial S: Wales.

VII.—Non-Industrial N. Wales.

C.—INDUSTRIAL AND NON-INDUSTRIAL

WALES

WALES.		
Administrative Counties ...	304	274
County Boroughs ...	98	59
All Areas ...	402	333
		443
		118
		561
		1,021
		275
		1,296
		317
		70
		387
		248
		52
		300
		382
		90
		472
		947
		212
		1,159

APPENDIX IX—(continued).

(III).—Deaths among Single Women only.

Administrative Area.	1924-8.			1929-33.			
	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).	All Causes (140-150).	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).
A.—INDUSTRIAL.							
I.—Industrial S. Wales (excluding County Boroughs).							
Glamorgan	9	7	23	14	12	3	29
Monmouth (part)	2	4	7	3	2	3	8
Carmarthen (part)	—	—	1	2	4	—	6
Brecon (part)	—	—	—	—	1	1	2
	11	11	9	31	19	7	45
II.—County Boroughs.							
Cardiff	5	—	—	5	—	1	1
Merthyr Tydfil	2	—	—	2	—	—	3
Newport	—	—	—	1	—	—	1
Swansea	1	2	1	4	—	—	—
	8	2	1	11	3	2	5
III.—Industrial N.E. Wales.							
Denbigh (part)	3	2	2	7	—	1	1
Flint (part)	—	—	1	1	—	—	—
	3	2	3	8	—	1	1
IV.—Aggregate of Industrial Wales (I, II and III above)	22	15	13	50	21	8	51

B.—Non-INDUSTRIAL.

V.— <i>Non-Industrial S. Wales.</i>							
Monmouth (part) ...	1						
Carmarthen (part) ...	2	6	1	3	7	2	2
Brecon (part) ...	—	—	—	—	—	1	1
Radnor ...	—	—	—	—	—	—	—
Pembroke ...	—	—	—	—	—	—	—
Cardigan ...	—	—	—	—	—	—	—
	4	13	5	22	3	1	11

VI.— <i>Non-Industrial N. Wales.</i>							
Denbigh (part) ...	—	1	—	—	—	2	2
Flint (part) ...	—	1	—	—	—	—	—
Anglesey ...	—	3	1	4	1	1	2
Caernarvon ...	—	1	3	5	—	—	—
Merioneth ...	—	1	1	2	—	3	3
Montgomery ...	—	—	—	—	1	1	1
	6	6	1	13	2	7	14

VII.—*Aggregate of Non-Industrial Wales
(V. & VI above) ...*

C.—INDUSTRIAL AND NON-INDUSTRIAL.

WALES.							
Administrative Counties ...	24	32	18	74	24	27	71
County Boroughs ...	8	2	1	11	3	2	5
All Areas ...	32	34	19	85	27	29	76

APPENDIX X.

Puerperal Mortality per 1,000 Live Births, 1924-8 and 1929-33, in the Counties and County Boroughs of Wales, distinguishing between Industrial and Non-Industrial Areas. The rates are for married and single women combined.

(For the constitution of areas "Industrial" and "Non-Industrial," see Appendix II.)

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Administrative Area.	1924-8.				1929-33.			
	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).	All Causes (140-150).	Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).	All Causes (140-150).
A.—INDUSTRIAL.								
I.— <i>Industrial S. Wales (excluding County Boroughs).</i>								
Glamorgan	1.70	1.38	2.43	5.51	2.25	1.77	2.28	6.29
Monmouth (part)	1.32	1.38	1.71	4.41	2.30	1.58	2.63	6.51
Carmarthen (part)	1.43	1.86	2.36	5.66	1.98	2.75	2.75	7.48
Brecon (part)	3.02	2.41	1.21	6.64	1.94	1.55	2.33	5.82
	1.61	1.45	2.22	5.28	2.23	1.86	2.41	6.44
II.— <i>County Boroughs.</i>								
Cardiff	1.89	0.67	2.38	4.95	1.57	1.19	1.74	4.50
Merthyr Tydfil	2.02	1.61	2.55	6.18	1.61	1.61	2.15	5.37
Newport	2.22	1.06	1.06	4.34	1.14	0.76	1.77	3.67
Swansea	1.77	1.52	2.34	5.63	1.87	1.22	2.30	5.39
	1.93	1.11	2.17	5.21	1.59	1.18	1.96	4.73
III.— <i>Industrial N.E. Wales.</i>								
Denbigh (part)	2.04	2.28	2.16	6.47	2.26	1.41	2.96	6.63
Flint (part)...	1.99	1.20	2.79	5.98	2.29	1.68	1.68	5.65
	2.02	1.76	2.46	6.24	2.27	1.54	2.35	6.16
IV.— <i>Aggregate of Industrial Wales.</i>								
(I, II and III above) ...	1.73	1.38	2.22	5.33	2.06	1.60	2.28	5.94

B.—Non-INDUSTRIAL.

V.— <i>Non-Industrial S. Wales.</i>						
Monmouth (part) ...	0.89	1.56	4.02	1.32	0.26	2.38
Carmarthen (part) ...	0.77	3.10	6.98	0.92	2.30	1.84
Brecon (part) ...	0.89	0.44	0.89	0.53	—	1.06
Radnor ...	1.04	1.56	3.12	2.39	0.60	1.79
Pembroke ...	0.51	1.28	2.30	2.60	1.59	3.33
Cardigan ...	2.98	0.99	2.98	1.72	1.43	2.58
	1.09	1.60	2.37	5.06	1.72	1.27

VI.—*Non-Industrial N.*

<i>Wales.</i>						
Denbigh (part) ...	2.48	2.12	1.95	2.21	1.61	2.82
Flint (part) ...	2.35	—	1.96	2.53	1.26	2.11
Anglesey ...	2.83	1.41	3.06	2.42	1.08	2.69
Caernarvon ...	1.30	1.95	2.05	0.84	1.43	2.51
Merioneth ...	1.89	1.08	2.70	5.67	1.59	2.54
Montgomery ...	0.87	1.30	2.17	4.34	0.79	2.11
	1.83	1.53	2.27	5.63	1.59	1.52

VII.—*Aggregate of Non-Industrial Wales*
(V and VI above)

WALES.						
Administrative Counties ...	1.61	1.50	2.26	5.38	2.06	2.43
County Boroughs ...	1.93	1.11	2.17	5.21	1.59	1.96
All Areas ...	1.49	1.56	2.32	5.34	1.96	2.33

C.—INDUSTRIAL AND Non-INDUSTRIAL.

WALES.						
Administrative Counties ...	1.61	1.50	2.26	5.38	2.06	2.43
County Boroughs ...	1.93	1.11	2.17	5.21	1.59	1.96
All Areas ...	1.68	1.42	2.24	5.34	1.96	2.33

APPENDIX XI.

Puerperal Mortality per 1,000 Live Births, 1924-8 and 1929-33, in the Industrial and Non-Industrial Divisions of Wales, among: (1) Married Women, (2) Single Women, (3) Married and Single combined.

(For the constitution of areas "Industrial" and "Non-Industrial," see Appendix II.)

Note.—The rates for Married Women are calculated on the number of legitimate births and the rates for Single Women on the number of illegitimate births. Widows are included under Married Women.

		1924-8.		1929-33.	
		Sepsis (140 and 145).	Toxaemias (146 and 147).	Other (141-4 and 148-50).	All Causes (140-150).
A.—INDUSTRIAL					
I.—Glamorgan and the Industrial parts of Monmouth, Carmarthen and Brecon.					
Married	1.58	1.41	2.22	5.21	1.68
Single	2.65	2.65	2.17	7.47	4.98
Married and Single	1.61	1.45	2.22	5.28	1.80
II.—County Boroughs (Cardiff, Merthyr Tydfil, Newport and Swansea).					
Married	1.84	1.11	2.22	5.17	1.58
Single	4.61	1.15	0.58	6.34	1.80
Married and Single	1.93	1.11	2.17	5.21	1.59
III.—Industrial parts of Denbigh and Flint.					
Married	1.90	1.71	2.36	5.98	1.61
Single	4.60	3.07	4.60	12.28	—
Married and Single	2.02	1.76	2.46	6.24	2.27
IV.—Aggregate of Industrial Wales (I, II and III above).					
Married	1.68	1.35	2.23	5.26	1.99
Single	3.36	2.30	1.99	7.65	3.64
Married and Single	1.73	1.38	2.22	5.33	1.60

B.—Non-INDUSTRIAL.

V.—Cardigan, Pembroke and Radnor and the Non-Industrial parts of Monmouth, Carmarthen and Brecon.		
Married	... ...	... 1.16
Single	... ...	2.76 0.99
Married and Single	... ...	1.09 2.76
VI.—Anglesey, Caernarvon, Merioneth and Montgomery and the Non-Industrial parts of Denbigh and Flint.		
Married	... ...	1.77 1.44
Single	... ...	2.63 2.31
Married and Single	... ...	1.83 3.44
VII.—Aggregate of Non-Industrial Wales (V and VI above).		
Married	... ...	1.40 1.31
Single	... ...	2.68 5.09
Married and Single	... ...	1.49 1.56

C.—INDUSTRIAL AND Non-INDUSTRIAL.

Administrative Counties.		
Married	... ...	1.56 1.40
Single	... ...	2.81 3.75
Married and Single	... ...	1.61 1.50
County Boroughs.		
Married	... ...	1.84 1.11
Single	... ...	4.61 1.15
Married and Single	... ...	1.93 1.11
All Areas.		
Married	... ...	1.62 1.34
Single	... ...	3.12 3.31
Married and Single	... ...	1.68 1.42

APPENDIX XII.

Puerperal Mortality per 1,000 Live Births for the two periods 1924-8 and 1929-33 in the Urban and Rural Districts of Glamorgan, distinguishing between the Districts scheduled as Special Areas and those not scheduled as Special Areas.

Administrative Area.	1924-28.			1929-33.		
	No. of Live Births.	No. of Puerperal Deaths.	Death-rate per 1,000 Live Births.	No. of Live Births.	No. of Puerperal Deaths.	Death-rate per 1,000 Live Births.
<i>Special Areas.</i>						
1. <i>Urban Districts.</i>						
Aberdare U.D.	4,569	26	5.69	3,405	29	8.52
Caerphilly U.D.	4,724	30	6.35	3,550	19	5.35
Gellygaer U.D.	5,344	24	4.49	4,177	22	5.27
Mountain Ash U.D.	4,626	36	7.78	3,508	26	7.41
Pontypridd U.D.	5,185	35	6.75	3,762	30	7.97
Port Talbot M.B.	4,543	15	3.30	3,600	24	6.67
Rhondda U.D.	16,360	86	5.26	12,110	80	6.61
Bridgend U.D.	939	5	5.79	707	6	6.32
Glyncofwrwg U.D.	1,439	9		1,105	9	
Maesteg U.D.	3,163	17		2,342	15	
Ogmore and Garw U.D.	3,274	20	5.88	2,329	11	6.64
Llantrisant and Llantwit Fardre R.D.	3,233	19	2,561	17	17	
Neath R.D.	4,133	17	4.11	3,352	20	
Penybont R.D.	3,136	14	4.46	2,525	19	
Cardiff R.D.	2,178	9	4.35	1,960	10	
Cowbridge R.D.	1,274	6		870	2	
<i>Total for Special Areas</i>	368		5.40	51,863		6.54
	68,120					

APPENDIX XIII.

Number of Puerperal Deaths in Wales, 1929-33, according to Age and separate Cause of Death.

Cause of Death.	Wales I.				Wales II.							
	All Ages 15-	15-	25-	30-	35-	40-	All Ages 15-	15-	25-	30-	35-	40-
All Causes ((1) to (5) below) ...	922	190	228	204	96	—	313	43	81	83	73	33
(1) Abortion (140, 141) ...	...	130	18	27	30	38	27	4	7	—	6	3
(2) Sepsis (145) ...	...	218	56	60	45	35	22	15	26	25	22	4
(3) Haemorrhages (142, 144) ...	...	121	11	27	30	40	13	40	4	12	10	10
(4) Toxaemias (146, 147) ...	...	251	73	50	55	50	23	78	7	23	20	7
(5) Other Causes (143, 148-50) ...	...	202	32	64	44	41	21	76	13	21	19	9
(6) All Causes less Abortion ((2) to (5)) ...	792	172	201	174	166	79	286	39	74	76	67	30

PROPORTIONATE MORTALITY OF PUERPERAL DEATHS.

All Causes, 1929-33 (as above) ...	100.0	20.6	24.7	22.1	22.1	10.4	100.0	13.7	25.9	26.5	23.3	10.5
Puerperal Deaths, 1929-34, investigated by Medical Officers of Health ...	100.0	20.5	26.8	21.8	22.7	8.1	100.0	15.9	22.3	24.7	26.5	10.6

APPENDIX XIV.

Number of Puerperal Deaths in Wales investigated by Medical Officers of Health during 1929-34, and the Number of Stillbirths entered in the Midwives' Registers, 1934, according to the Age of the Mother and the Order of Pregnancy.

(1) PUERPERAL DEATHS, 1929-34.

Number of Pregnancy.	15-	25-	30-	35-	40-	All ages.
1	124	116	55	52	9	356 (41.7)
2	29	43	46	30	5	153 (17.9)
3	9	32	29	25	7	102 (12.0)
4	4	13	22	21	9	69 (8.1)
5	—	7	17	25	8	57 (6.7)
6 and 7 ...	1	10	14	22	12	59 (6.9)
8 and more	—	—	8	25	24	57 (6.7)
Total Deaths.	167 (19.6 Per cent.)	221 (25.9 Per cent.)	191 (22.4 Per cent.)	200 (23.4 Per cent.)	74 (8.7 Per cent.)	853 (100.0 Per cent.)

(2) STILLBIRTHS, 1934.

Number of Pregnancy.	15-	25-	30-	35-	40-	Age not stated.	All ages.
1	303	195	111	45	21	5	680 (39.3)
2	66	95	71	39	7	5	283 (16.3)
3	19	57	56	39	23	9	203 (11.7)
4	6	28	47	33	14	1	129 (7.5)
5	3	23	34	42	22	2	126 (7.3)
6 and 7 ...	—	10	42	54	32	5	143 (8.3)
8 and more	—	4	22	52	88	1	167 (9.6)
Total Stillbirths.	397 (22.9 Per cent.)	412 (23.8 Per cent.)	383 (22.1 Per cent.)	304 (17.6 Per cent.)	207 (12.0 Per cent.)	28 (1.6 Per cent.)	1,731 (100.0 Per cent.)

APPENDIX XV.

Death-rates from certain Causes among Females ages 15-45 in the Administrative Counties and County Boroughs of Wales, with the ratio which each rate bears to the rate for Wales (= 100 in each case).

Note.—The death-rates shown are : (1) from Puerperal Causes per 1,000 live births ; (2) for All Causes, Tuberculosis, and all Causes other than Puerperal, per 100,000 of the female population ages 15-45.

		Mortality per cent. of the rate for Wales.					
		Death-rates (see Note above).		All Causes.		Tuberculosis (All Forms).	
Administrative Area.		Puerperal Causes.	All Causes.	All Causes other than Puerperal.	Puerperal Causes.	All Causes.	Tuberculosis (All Forms).
		1924-28.	1929-33.	1931-33.	1924-28.	1929-33.	1931-33.
Wales	...	5.34	5.85	439	153	399	100
<i>Industrial Counties.</i>						100	100
Glamorgan	...	5.51	6.29	485	163	439	103
Monmouth	...	4.36	6.19	461	142	414	82
<i>Semi-Industrial Counties.</i>						107	105
Brecon	...	4.84	4.03	453	189	432	91
Carmarthen	...	6.05	6.70	425	142	378	113
Denbigh	...	6.50	6.63	416	118	368	122
Flint	...	5.56	5.72	327	91	295	104
						103	91
						114	113
						97	122
						95	113
						92	98
						77	74
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						59	59
						108	74

APPENDIX XVI.
Maternal Deaths in Wales investigated by Medical Officers of Health during 1929-34, classified under separate Cause of Death.

Classification on fuller information following scrutiny of records.

Cause as certified to the Registrar-General, with International List Number.	Puerperal Deaths.					" Associated " Deaths (i.e., from inter-current Disease).	Total Maternal Deaths.
	Abortion.	Haemorrhages.	Sepsis.	Toxaemias.	Trauma.		
							152
140. Post-abortive sepsis ...	64	—	1	—	—	—	65
141. Abortion not returned as septic ...	18	8	—	—	—	—	26
142. Ectopic gestation ...	—	8	—	—	—	1	9
143. Other accidents of pregnancy ...	1	1	—	—	1	—	3
144. Puerperal haemorrhage ...	1	107	—	—	10	123	123
145. Puerperal sepsis not returned as post-abortive ...	3	—	2	3	4	246	247
146. Puerperal albuminuria and convulsions ...	1	—	236	3	4	148	168
147. Other toxæmias of pregnancy ...	1	1	5	136	5	20	36
148. Puerperal phlegmasia alba dolens, embolism and sudden death ...	2	5	1	30	2	1	36
149. Other accidents of childbirth ...	6	6	24	5	43	79	82
150. Other or unspecified conditions of the puerperal state ...	—	2	8	4	57	75	75
	—	6	—	—	5	13	19
Totals 140-150 ...	91	139	283	181	127	821	32
Deaths from " Associated " Causes :							
(i) Pregnancy mentioned on certificate	9	9	21	17	39	101	95
(ii) Pregnancy not mentioned on certificate	2	2	3	2	3	19	11
Total " Associated " Causes ...	24	11	24	19	42	120	106
Total Maternal Deaths ...	115	150	307	200	169	941	138

APPENDIX XVII.

Maternal Deaths in Wales, 1929-34, among Women who had a History of Non-Puerperal Disease.

(The deaths in this Table are deaths which were investigated by Medical Officers of Health, and are included in the 1,079 deaths classified in Appendix XVI.)

Condition present.	Total Maternal Deaths.	Cause of Death as Certified.		Cause of Death on re-classification after scrutiny of the records of Medical Officers of Health.	
		Puerperal.	"Associated" Causes.	Puerperal.	"Associated" Causes.
1. Diseases of the Heart ...	103	31	72	54	49
2. Diseases of the Renal System	57	43	14	32	25
3. Infective Conditions					
(a) Tuberculosis	27	13	14	15	12
(b) Influenza	28	8	20	15	13
(c) Venereal Diseases ...	13	12	1	13	—
(d) Other Infective Conditions	20	17	3	18	2
4. Gynaecological Diseases ...	42	34	8	40	2
5. Anaemia and Diseases of the Blood	35	25	10	28	7
6. Diseases of the Respiratory System	27	18	9	18	9
7. Miscellaneous Diseases					
(a) Diseases of the Alimentary System	9	7	2	7	2
(b) Diseases of the Thyroid Gland	12	6	6	9	3
(c) Disability, Congenital Deformities, etc. ...	4	3	1	4	—
(d) Nervous and Mental Diseases	9	9	—	8	1
(e) Appendicitis	7	7	—	7	—
(f) Other	22	17	5	20	2
All Deaths	415	250	165	288	127

APPENDIX XVIII.

Particulars of Cases attended by Midwives in Wales, 1934.

Form of Presentation.	Number of Births.			Maternal Deaths among the Births*.		Stillbirth frequency per 1,000 total Births.
	Live Births.	Still-Births.	Total Births.	Number of Deaths.	Death-rate per 1,000 total Births.	
V.Simp. ...	28,089	899	28,988	48	1.7	31
V.O.P. ...	2,170	152	2,322	7	3.0	65
Breech ...	820	359	1,179	8	6.8	304
Trans. ...	17	23	40	2	50.0	575
Face ...	105	25	130	1	7.7	192
Brow ...	31	5	36	—	—	139
Twins ...	345†	69†	414†	5	12.1	167
Not stated	1,937	199	2,136	18	8.4	93
Undelivered	33,514	1,731	35,245	89	2.5	49
	—	4	4	4	—	—
All Births	33,514	1,735	35,249	93	2.6	49

* The Midwives' Registers do not contain a complete record of maternal deaths among their cases which have been admitted to hospital.

† These figures represent the number of labours.

Note.—In addition there were 739 miscarriages included in the Midwives' Registers.

APPENDIX XIX.

Relation of Type of case to Operative Interference.

(1) MIDWIVES CASES, 1934.

Manipulative Interference.						Total Manipulative Interference.	
Type of case.	Anaesthetic only.	Version.	Caesarean Section.	Craniotomy.	Manual Removal of Placenta.	Forceps and other forms of interference not specified.	No Interference.
Maternity	6,033	406	40	7	7	2,177	2,238 (37.1 per cent.)
Midwifery	27,391	269	56	8	6	51	2,306 (8.4 per cent.)
Hospital ...	2,535	160	20	76	3	12	412 523 (20.6 per cent.)
Total ...	35,959*	835	116	91	16	70	4,774 5,067 (14.1 per cent.)
							30,057

* Information was not stated in 29 cases of the total of 35,988 attended by midwives.

APPENDIX XIX—(continued).

(2) INVESTIGATED DEATHS, 1929-34, OCCURRING AT OR AFTER THE 28TH WEEK OF PREGNANCY.

Type of case.	Total cases.	Manipulative Interference.				No Interference.	Total Manipulative Interference.
		Anaesthetic only.	Version.	Caesarean Section.	Craniotomy.		
Maternity	219	7	21	1	8	12	93
Midwifery	348	6	30	—	15	15	93
Hospital ...	279	5	29	42	4	17	88
No Nurse present...	62	—	—	—	1	2	6
Total ...	908	18	80	43	28	46	280
							477 (52.5 per cent.)
							413



